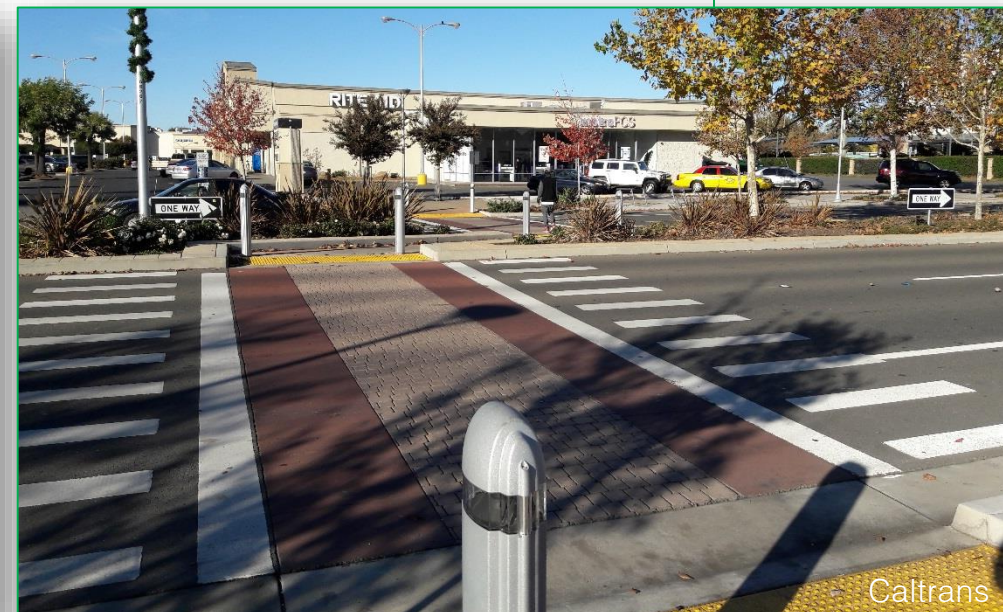




Complete Streets Elements Toolbox



Prepared by:

Smart Mobility and Active Transportation Branch
Jessica Downing and Dustin Foster



Complete Streets Elements Toolbox

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Complete Streets Elements Toolbox

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Bicycle Elements			
ID	Activity Description	Activity Unit	Slide #
H01	Bike Box	EA	25
H02	Bike Parking	EA	29
H05	Class I Bike Paths	Linear Miles	33
H06	Class II Bike Lanes	Lanes Miles	35
H07	Class III Bike Routes	Lanes Miles	36
H08	Class IV Separated Bikeway	Lanes Miles	37
H10	Conflict Zone Green Paint	EA	43

Pedestrian Elements			
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H13	Crosswalks	EA	46
H12	Enhanced Crosswalk Visibility	EA	50
H11	Crossing Islands	EA	55
H14	Curb Extensions/Bulb-Out	EA	61
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Complete Streets Elements Toolbox

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Bicycle and Pedestrian Elements

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ID	Activity Description	Activity Unit	Slide #
H04	<u>Bus Bay/ Turnout/ Pull Out</u>	EA	94
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H16	<u>Lane Reduction (Road Diet)</u>	Linear Miles	90

Vegetative Elements

ID	Activity Description	Activity Unit	Slide #
H21	<u>Vegetative Street Swale</u>	EA	103
H22	<u>Vegetative Buffer Between Cars/Bikes/Peds</u>	EA	106

Complete Streets Elements Toolbox

How to Use the Toolbox

Welcome to the *Complete Streets Elements Toolbox*, a ‘living document’ that will be modified as Caltrans’ guidance is updated and new elements are added to the Toolbox.

This guide aims to define, provide guidance, and quantify Complete Streets Elements in the SHOPP Tool to assist in the implementation of Complete Streets.

The guide is organized by a table of contents and each element features information including a definition, guidance, and examples or diagrams. Each element guidance concludes with a series of slides that demonstrate how to quantify each specific Complete Streets Element in the SHOPP Tool. This section describes the organization of each portion of the toolbox in greater detail.



Complete Streets Elements Toolbox

How to Use the Toolbox

Table of Contents:

- The table of contents features hyperlinks to each slide allowing users to easily access specific elements within the toolbox. When a blue hyperlinked title of a Complete Streets elements is clicked on, users will be taken directly to that slide. The Complete Streets features are listed with their corresponding IDs in the SHOPP Tool, unit of measurement (activity unit), and are categorized by mode type. The last slide of each element contains a hyperlink in the lower left corner that will redirect back to the [Table of Contents](#).

Complete Streets Elements Toolbox Table of Contents

Bicycle Elements		
ID	Activity Description	Activity Unit
H01	Bike Box	EA
H02	Bike Parking	EA
H05	Class I Bike Paths	Linear Miles
H06	Class II Bike Lanes	Lanes Miles
H07	Class III Bike Routes	Lanes Miles
H08	Class IV Separated Bikeway	Lanes Miles
H10	Conflict Zone Green Paint	EA

Pedestrian Elements		
ID	Activity Description	Activity Unit
H13	Crosswalks	EA
H12	Enhanced Crosswalk Visibility	EA
H11	Crossing Islands	EA
H14	Curb Extensions/Bulb-Out	EA
H20	Install Shade for Pedestrian Access	EA
H17	LED Lighting	EA

Complete Streets Elements Toolbox

How to Use the Toolbox

Complete Streets Elements Title Slides:

- Each element features a title slide where it is defined and guidance is given.
 - Definitions are provided for each element as they apply to Complete Streets.
 - Design guidance is included and is hyperlinked in blue so that users can easily access additional information about each Complete Streets element.

H18: Overpass/Underpass – Pedestrian and Bike

Definition:

- A facility for pedestrians and/or bicycles that provides a connection either over or under a state highway facility that is separate from motor vehicle traffic.
- Pedestrian overcrossings (POC) or undercrossings (PUC) connect pedestrian walkways; bicycle overcrossings (BOC) or undercrossings (BUC) connect bikeways or bike routes and can be built to Class I or Class IV standards.

Guidance:

- Must be ADA accessible.
- 8 ft. wide minimum walkway; 14 ft. if the overpass accommodates bicycles
- See [HDM 208.6](#), [HDM Topic 309.2](#), [HDM Topic 1003.1](#), [DIB 82](#), and [DIB 89](#) for more information.



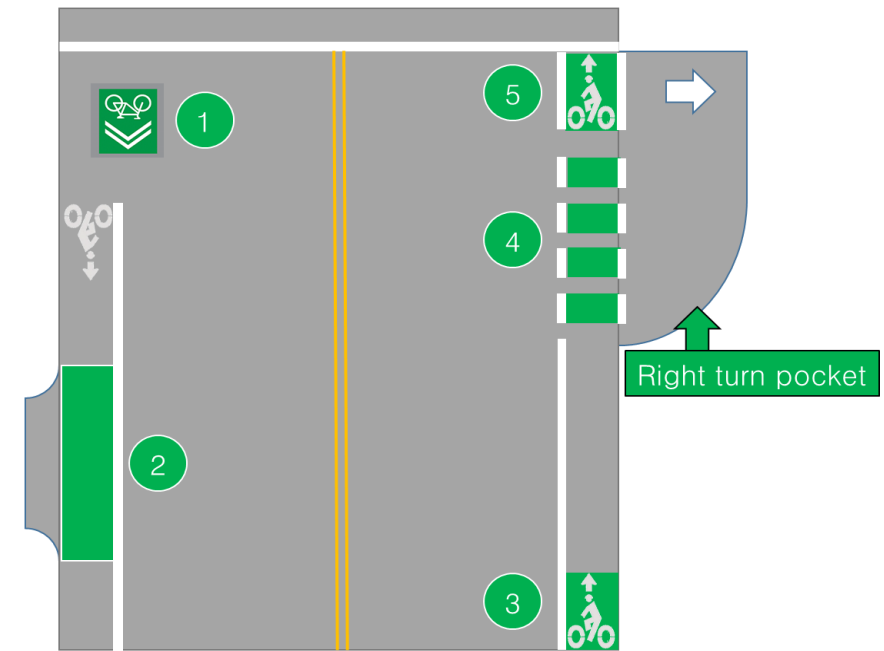
Complete Streets Elements Toolbox

How to Use the Toolbox

Diagrams and Featured Projects:

- The elements listed in the toolbox are all shown as diagrams or featured project photos to give examples of how each element is quantified in the SHOPP Tool.
- Elements featured within the project or diagram are numbered to further demonstrate quantification methods. Some elements show before and after diagrams or photos for additional guidance.

Quantifying conflict zone green paint in the SHOPP Tool



Complete Streets Elements Toolbox

How to Use the Toolbox

Quantification in the SHOPP Tool Examples

- The final slide for each Complete Streets element shows how the quantification would look in the SHOPP Tool entry. Some fields are highlighted or feature green arrows to address which activity detail, quantity placement, and comments are necessary to properly address each element. It is important to remember to only add quantities to the 'Assets in Poor Condition' or 'New Asset Added' columns.
- Each Quantification slide features a hyperlink in the lower left corner that will return to the table of contents.

Quantifying Bike Boxes in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H01	Streets	Bike Box (201.999)	EA	2				2	



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Complete Streets Elements Toolbox

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Division of Transportation Planning

Office of Smart Mobility and Climate Change

Smart Mobility and Active Transportation Branch



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Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

What is a Complete Street?

Definition:

- “A transportation facility that is planned, operated and maintained to provide safety mobility for **all users**, including bicyclists, pedestrians, transit riders, and motorists appropriate to the **function and context** of the facility.”
–Deputy Directive 64–R2
- Rather than a facility simply for the conveyance of automobiles, a Complete Street is a **public space** that conveys **pedestrians, cyclists, transit users**, and **freight** for commercial uses.



Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Prioritize:

- Multi-modal transportation planning:
 - Facilities designed for pedestrians, cyclists, transit users, automobile users, and freight.
- Safety and Health:
 - Using proven safety countermeasures to reduce collisions and provide access to all road users.
 - Increasing mobility of transportation modes that encourage physical activity.
- Environment:
 - Planning that reduces greenhouse gas emissions, pollution, and preserves open space.
- Economy:
 - Transportation facilities that provide access to commercial uses.

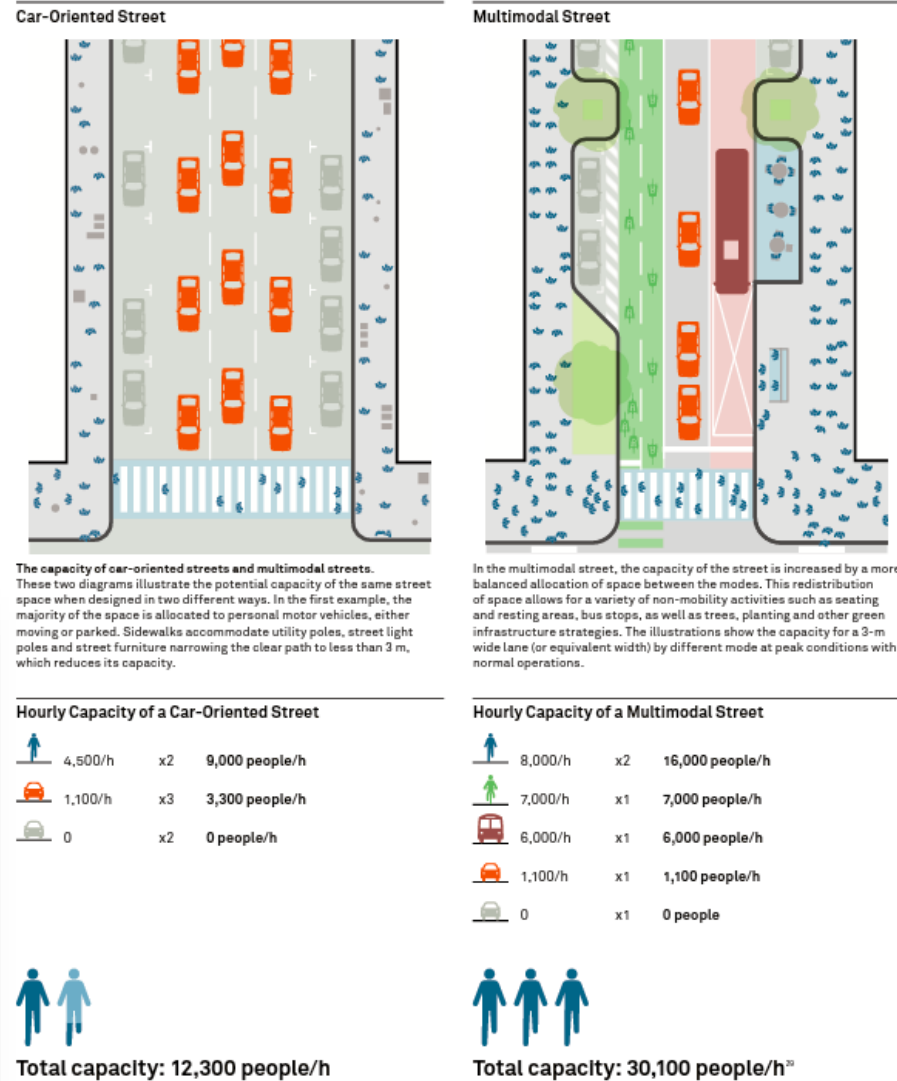
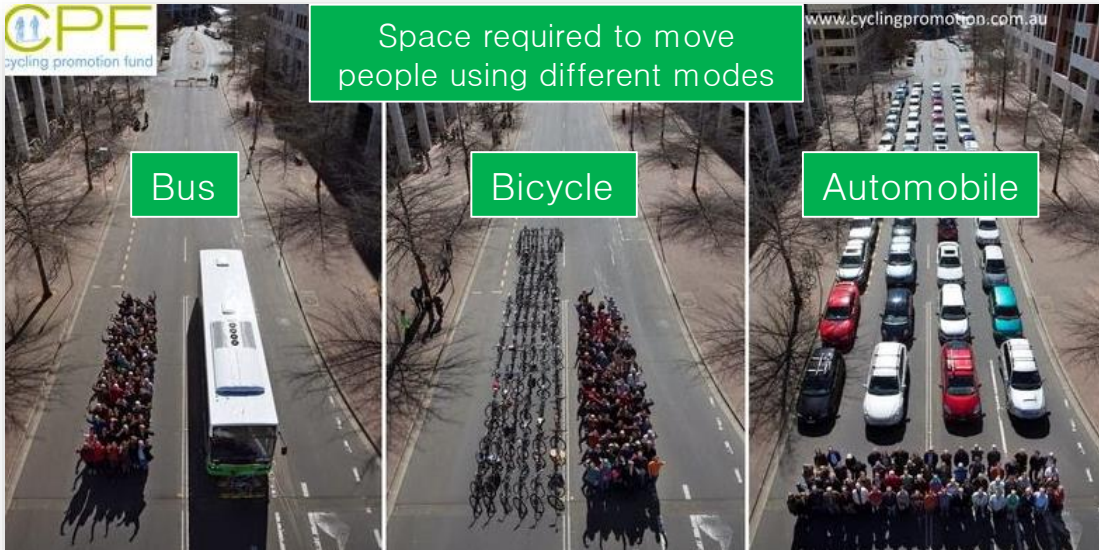


Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Concepts:

- Person Throughput:
 - In areas of dense activity, prioritization of modes that are more space efficient will lead to streets that have much higher person throughput.
 - A focus on automobile levels of service may lead to a reduction in person throughput and multi-modal trips.



Patrick Reynolds
Transportblog

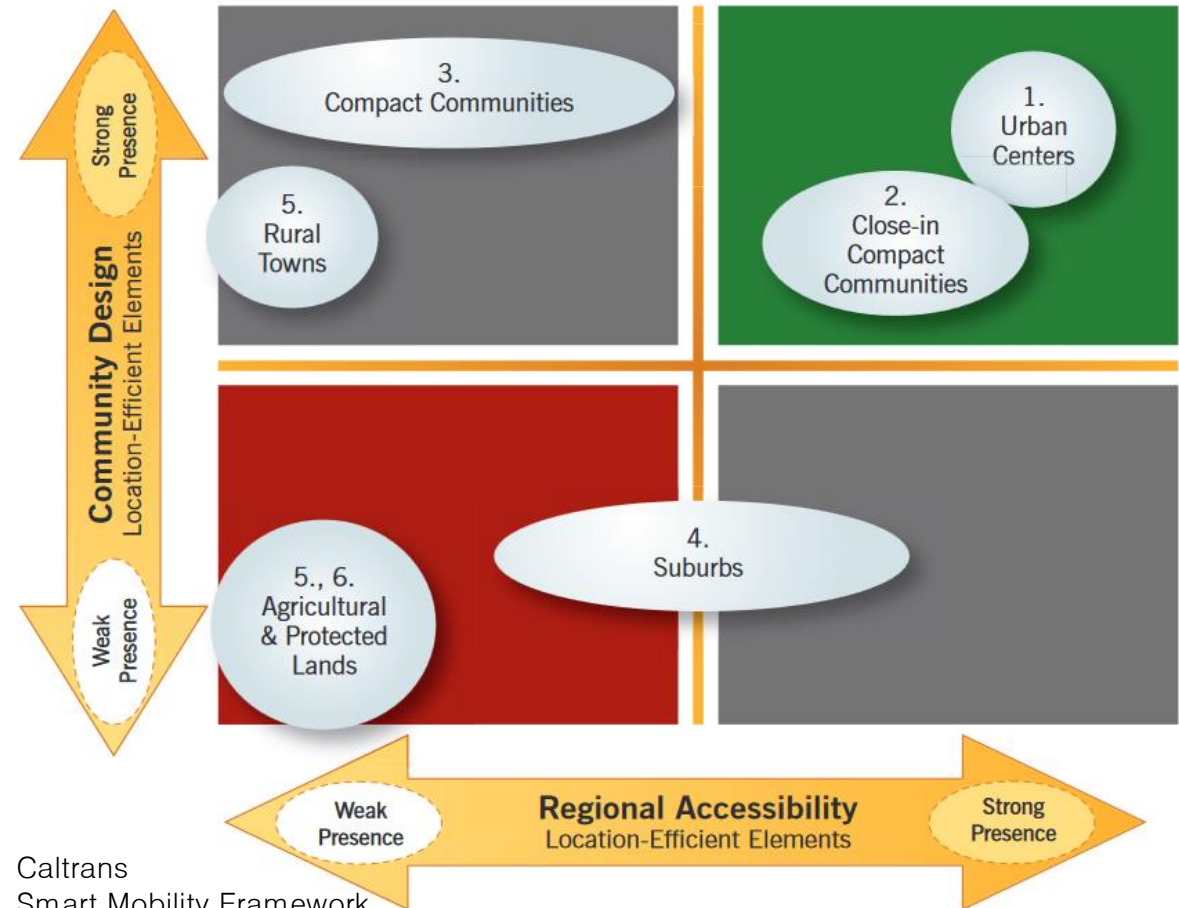
Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Concepts:

- Smart Mobility Place Types:
 - A concept from Caltrans' [Smart Mobility Framework](#) that suggests transportation facility planning and performance metrics should be based on the land use Place Types surrounding the facility.
- Place Types include:
 1. Urban Cores and Centers
 2. Close-in Compact Communities— centers, corridors and neighborhoods
 3. Compact Communities
 4. Suburban Communities— centers, corridors, dedicated use areas, and neighborhoods
 5. Rural and Agricultural Lands— towns, settlements and agricultural lands
 6. Protected Lands
 7. Special Use Areas

Exhibit 8: Smart Mobility Place Types and Location Efficiency Potential



Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Data Inputs:

- Local Plans:
 - Local communities, counties, and public transit providers provide plans detailing existing facilities in addition to proposed complete streets elements. Searching their websites for Plans can provide data on local complete streets priorities which may occur on the state highway system.
- Plans can include:
 - General Plan Circulation Element
 - Specific Plans
 - Bicycle and Pedestrian Plans
 - Complete Streets Plans
 - Safe Routes to School Plans
 - Short-range Transit Plans
 - Long-range Transit Plans

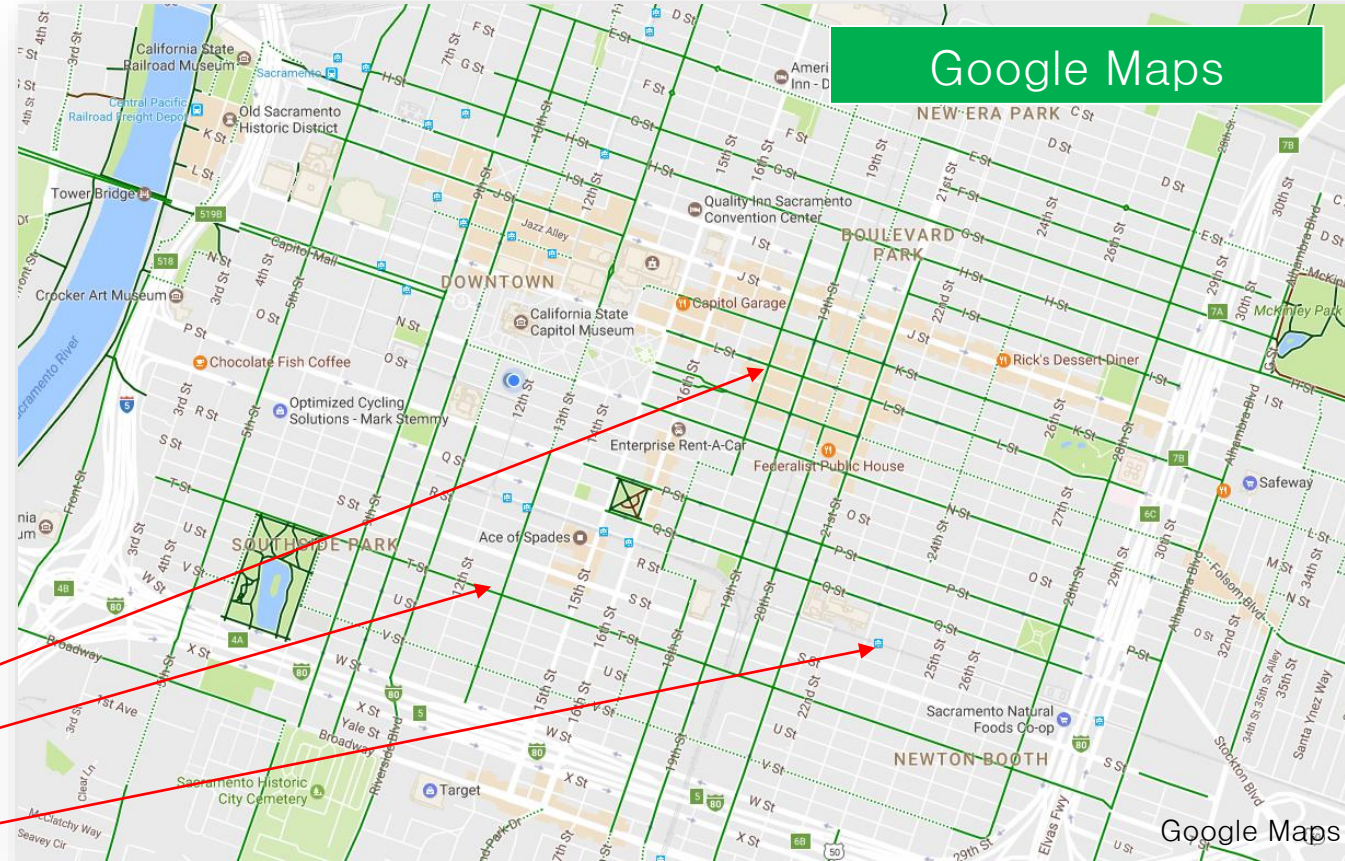


Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Data Inputs:

- Existing Conditions:
 - An understanding of the existing conditions can provide data on the need and appropriateness of Complete Streets element. This can be done using:
 - Field Review
 - Caltrans' Photolog
 - Google Maps
 - Street View
 - Commercial Corridors
 - Bicycle Networks
 - Transit Networks



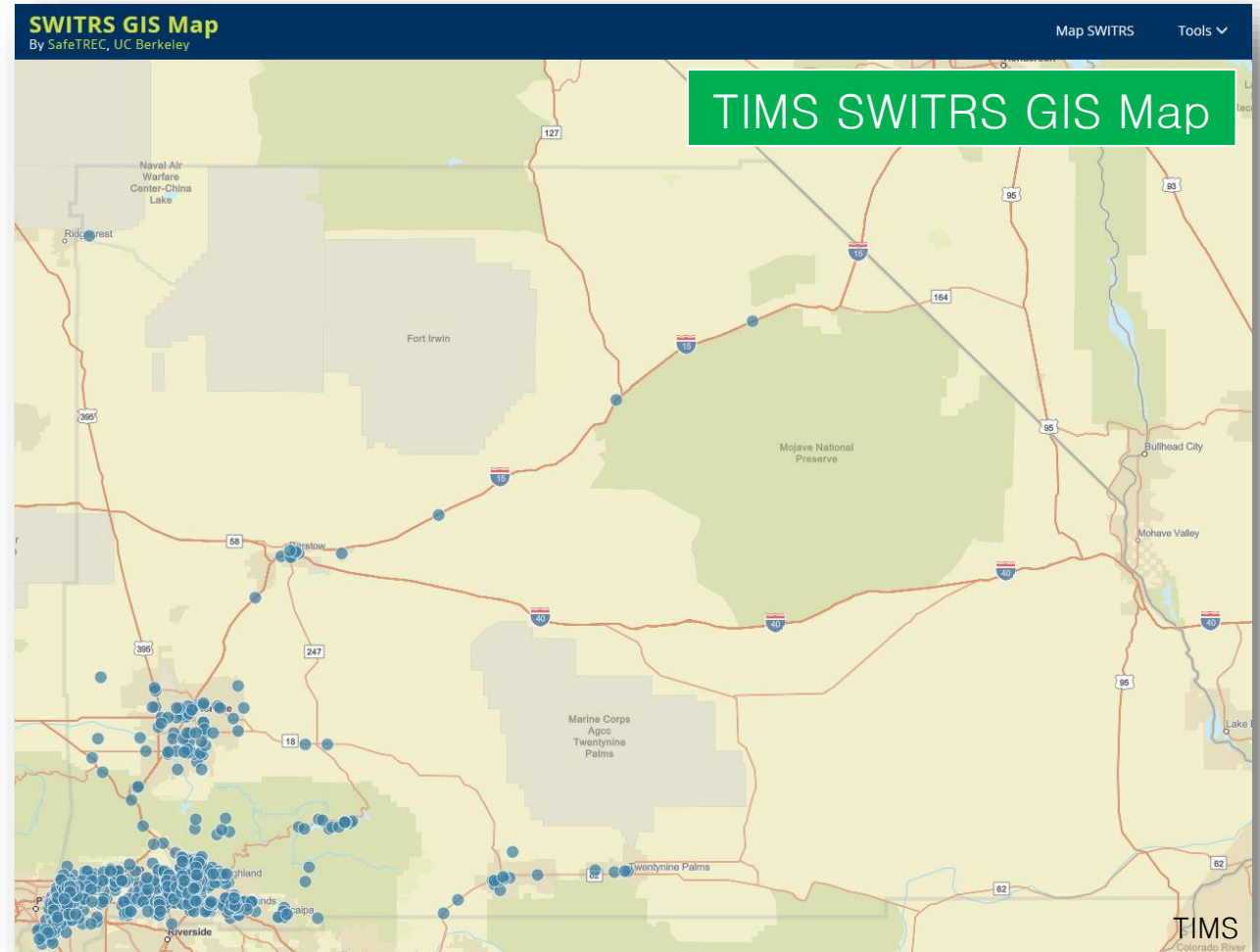
- Data Inputs
- Resources

Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Data Inputs:

- Bicycle and Pedestrian Collision Data:
 - The frequency and severity of bicycle and pedestrian collisions within project limits could provide justification for complete streets elements in projects.
 - Use engineering judgement when analyzing these collision data inputs.
 - Data can be analyzed using:
 - Caltrans' TASAS
 - [TIMS](#)

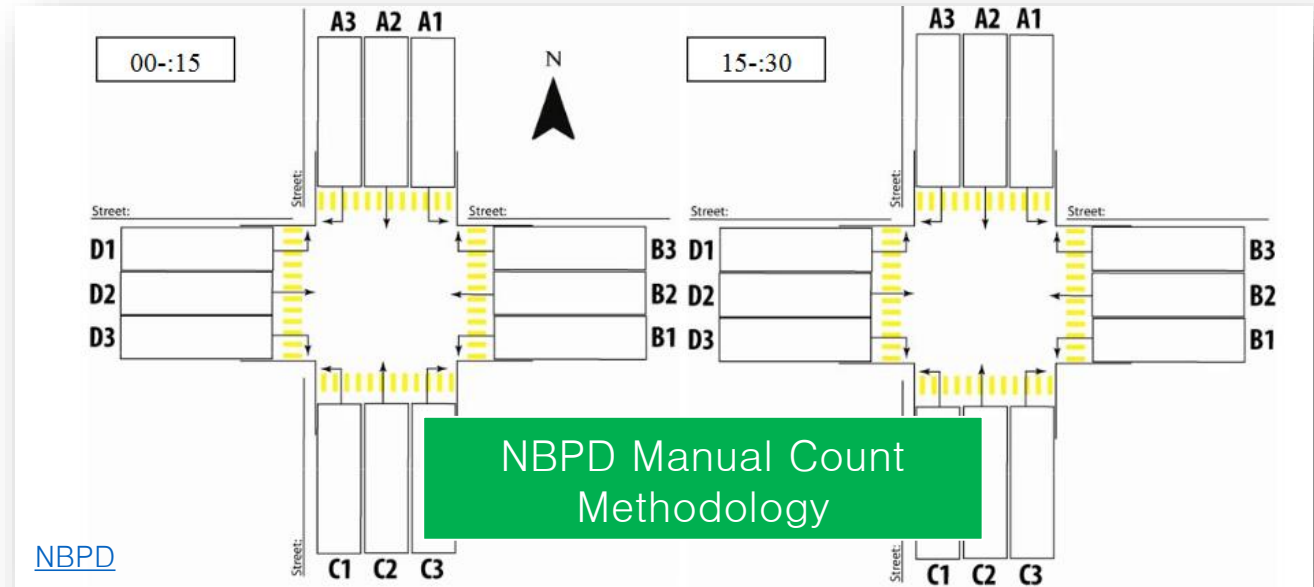


Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Data Inputs:

- Bicycle and Pedestrian Trip Count Data:
 - The collection of bicycle and pedestrian trip data within project limits could provide justification for complete streets elements in projects.
 - Data can be analyzed using:
 - [Census Mode Share](#) (Journey to Work) Data
 - [Manual Multi-modal Trip Count](#)
 - Portable Counters

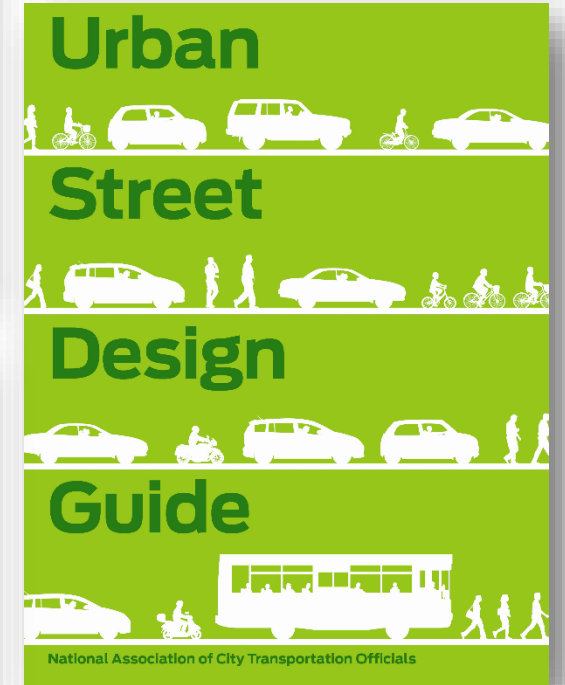
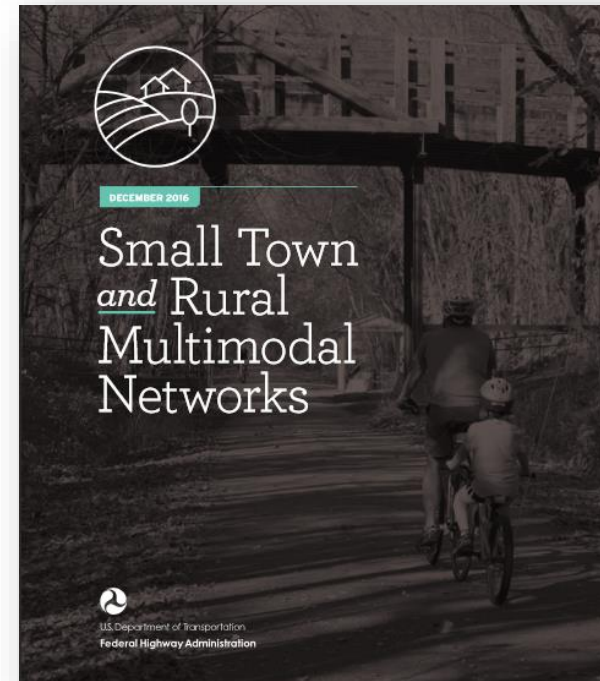
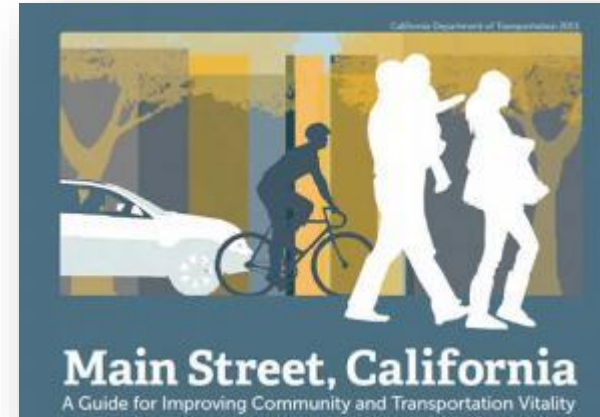


Complete Streets Elements Toolbox

An Introduction to Complete Streets Planning

Complete Streets Resources:

- [Caltrans' Deputy Directive 64-R2: Complete Streets- Integrating the Transportation System](#)
- [Caltrans' Main Street, California](#)
- [NACTO Urban Street Design Guide](#)
- [FHWA Small Town and Rural Multimodal Networks](#)



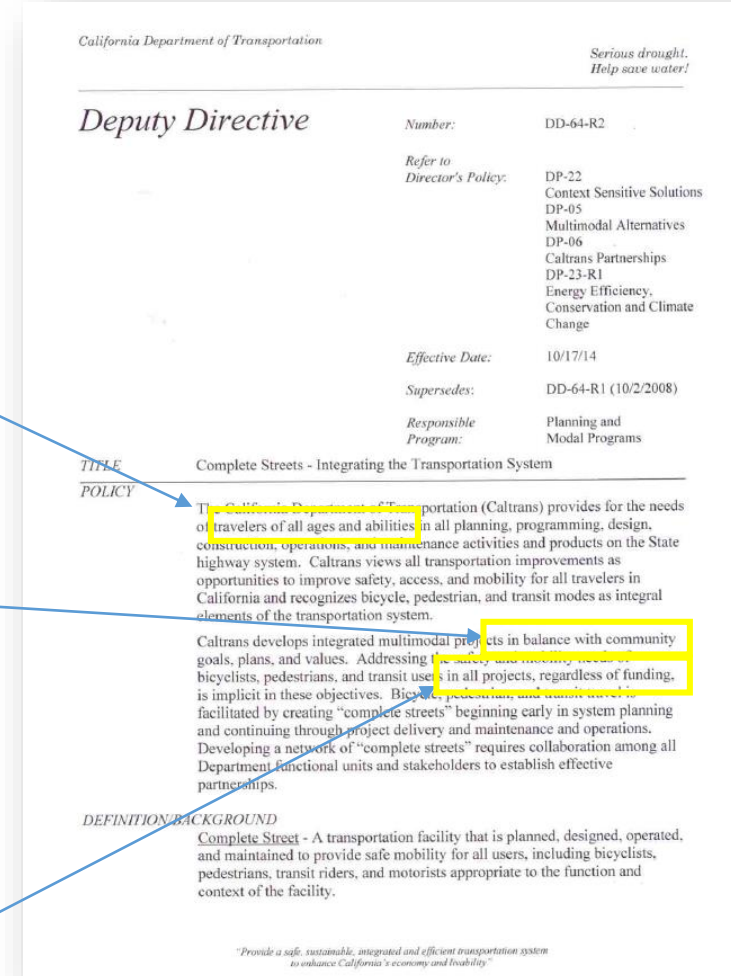
Complete Streets Elements Toolbox

Caltrans' Complete Streets Policy

Deputy Directive 64-R2

Policy:

- “Caltrans provides for the needs of travelers of **all ages and abilities**”.
 - This statement suggests that multi-modal transportation system users have differing abilities. Complete Streets planning should therefore try to provide safe, accessible facilities to cater to all users.
- “Caltrans develops integrated multimodal projects in balance with **community** goals, plans, and values”.
 - As many state highway facilities travel through communities, it is of utmost importance that local community desires and plans are referred to when planning a new project.
- “Addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in **all** projects, regardless of funding”.



Complete Streets Elements Toolbox

Caltrans' Complete Streets Policy

Deputy Directive 64-R2

Background:

- “Travelers of all ages and abilities can move safely and efficiently along and across a **network**”.
 - Caltrans recognizes that in order to increase multi-modal transportation requires a connected and integrated planned network of bikeways, walkways and transit routes. Caltrans facilities can be a part of that network.
- Cyclists and pedestrians are permitted on all state facilities aside from freeways where there are ‘reasonable, safe, and convenient alternative’ routes.
- “Roads designed to Caltrans’ standards provide basic access”.
 - Following Caltrans standards can provide accommodation, but going beyond minimum requirements may be appropriate in many Complete Streets contexts.

Deputy Directive
Number DD-64-R2
Page 2

The intent of this directive is to ensure that travelers of all ages and abilities can move safely and efficiently along and across a network of “complete streets.”

State and federal laws require Caltrans and local agencies to promote and facilitate increased bicycling and walking. California Vehicle Code (CVC) sections 21200-21212, and Streets and Highways Code (sections 890-894.2) identify the rights of bicyclists and pedestrians, and establish legislative intent that people of all ages using all types of mobility devices are able to travel on roads. Bicyclists, pedestrians, and non-motorized traffic are permitted on all state facilities, unless prohibited (CVC, section 21960). Therefore, the Department and local agencies have the duty to provide for the safety and mobility needs of all who have legal access to the transportation system.

Department manuals and guidance outline statutory requirements, planning policy, and project delivery procedures to facilitate multimodal travel, which includes connectivity to public transit for bicyclists and pedestrians. In many instances, roads designed to Caltrans’ standards provide basic access for bicycling and walking. This directive does not supersede existing laws. To ensure successful implementation of “complete streets,” manuals, guidance, and training will be updated and developed.

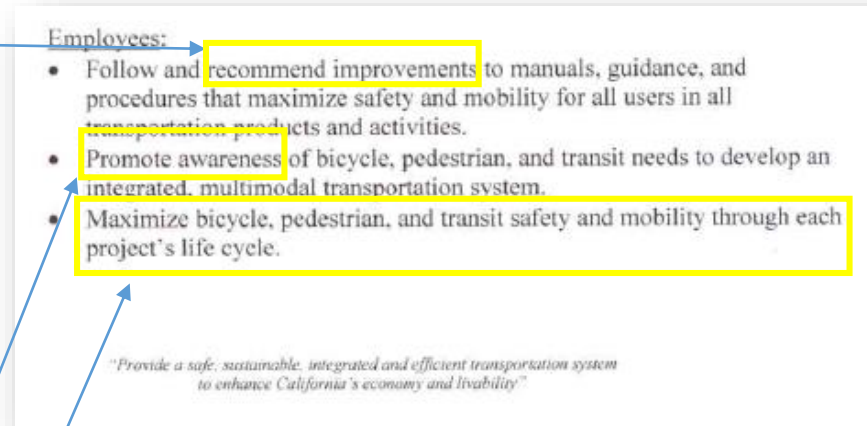
Complete Streets Elements Toolbox

Caltrans' Complete Streets Policy

Deputy Directive 64-R2

Responsibilities of All Caltrans Employees:

- “Follow and recommend improvements to manuals, guidance, and procedures”.
 - Integrating Complete Streets into all Caltrans processes will take on-going efforts to continually update Caltrans documents to reflect current best practice.
- “Promote awareness of bicycle, pedestrian, and transit needs”
 - Complete Streets requires advocacy in all offices within Caltrans.
- “Maximize bicycle, pedestrian, and transit safety and mobility through **each project's life cycle**”.
 - Complete Streets considerations can and should be used in within all projects.



Complete Streets Elements Toolbox

Caltrans' Strategic Management Plan 2015–2020

Several goals in Caltrans' Strategic Management Plan 2015–2020 include Complete Streets–related objectives. These include:

Goal	Strategic Objective	Performance Measure	Target
Goal 1: Safety and Health	Reduce user fatalities and injuries by adopting a “Toward Zero Deaths” practice.	Number of fatalities for bicycle, pedestrian, and transit modes of travel.	10% reduction in number of fatalities in a calendar year in each of the following mode types: car, transit, pedestrian, and bicyclist.
Goal 3: Sustainability, Livability and Economy	PEOPLE: Improve the quality of life for all Californians by providing mobility choice, increasing accessibility to all modes of transportation and creating transportation corridors not only for conveyance of people, goods, and services, but also as livable public spaces.	Percentage increase of non–auto modes for: Bicycle Pedestrian Transit	By 2020, increase non–auto modes: Triple bicycle; Double pedestrian; and Double transit. (2010–12 California Household Travel survey is baseline.)



Complete Streets Elements Toolbox

Caltrans' Strategic Management Plan 2015–2020

Goal	Strategic Objective	Performance Measure	Target
Goal 3: Sustainability, Livability and Economy	PLANET: Reduce environmental impacts from the transportation system with emphasis on supporting a statewide reduction of greenhouse gas emissions to achieve 80% below 1990 levels by 2050.	Per capita vehicle miles traveled. Percent reduction of transportation system–related air pollution for: Greenhouse gas (GHG) emissions Criteria pollutant emissions	By 2020, achieve 15% reduction (3% per year) of statewide per capita VMT relative to 2010 levels reported by District.
Goal 4: System Performance	Increase the number of Complete Streets features on State highways that are also local streets in urban, suburban, and small town settings.	Percentage of projects that include Complete Streets features. Number of Complete Streets features on State highway system. Percentage of high-focus actions fully implemented from the Complete Streets Implementation Action Plan 2.0.	By 2016, establish baseline and by 2020, increase annual number of Complete Streets projects by 20%. By 2016, establish baseline and by 2020, increase annual number of Complete Streets features by 5%. By 2016, implement 80% of the 14 high-focus actions. By 2018, implement 100% of the 14 high-focus actions.



H01: Bike Boxes

Definition:

- Designates an area for cyclists ahead of automobile traffic at a signalized intersection.
- Increases the visibility of cyclists.
- Can facilitate left turn positions during red signal indication.

San Luis Obispo
Madonna Road and Higuera St
(former SR-227)

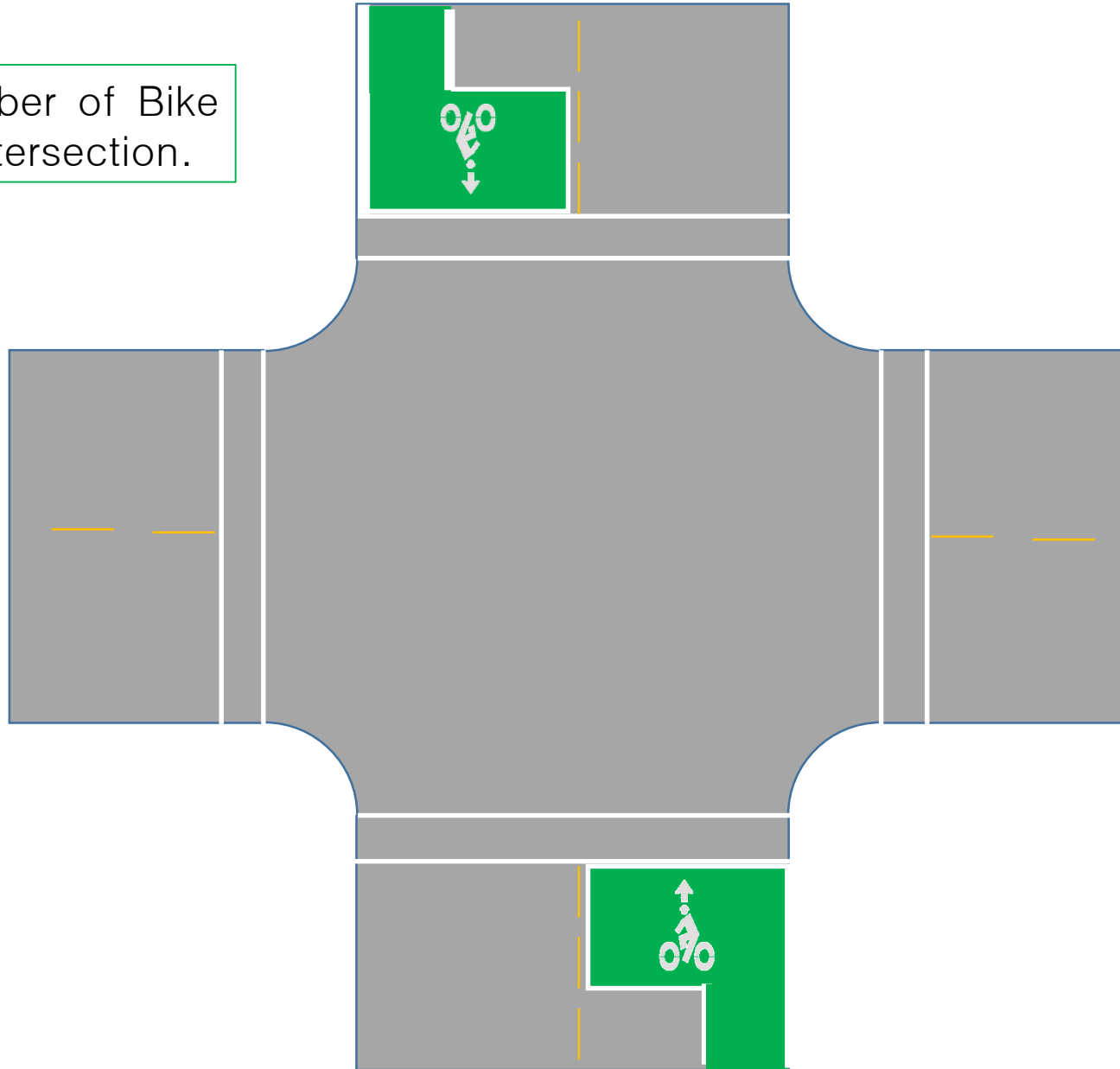


San Francisco
Scott Road

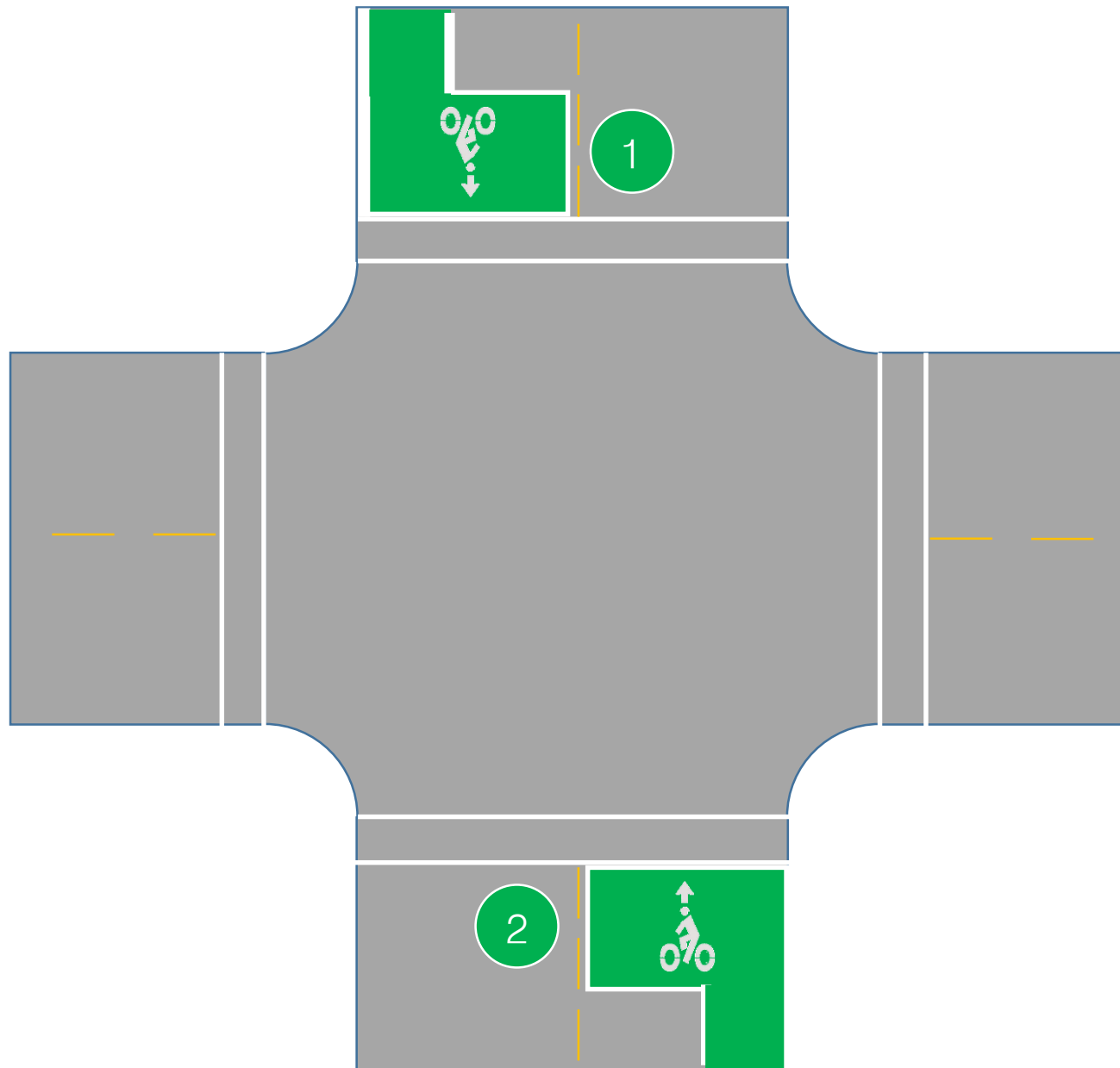


Quantifying Bike Boxes in the SHOPP Tool

- Count the number of Bike Boxes at this intersection.



Quantifying Bike Boxes in the SHOPP Tool



Quantifying Bike Boxes in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H01	Streets	Bike Box (201.999)	EA	2				2	



H02: Bike Parking

Definition:

- The availability of a secure, safe and convenient space to store a bicycle that provides access to destinations.

Guidance:

- Should be well lit and in plain view without being in the way of pedestrians and motor vehicles.
- Parking stalls must support the whole bike, not just a wheel, to prevent theft.
- Visit: Pedbikeinfo.org for more information.



H02: Bike Parking

Bike Corral:

- Road space reallocation that replaces underutilized space, or a parking space for one automobile vehicle, for 8–12 bicycle parking spaces.

Guidance:

- Should be located in high-activity commercial corridors.



LADOT
Gjelina



Caltrans

Quantifying Bike Parking in the SHOPP Tool

Count the number of spaces for bicycle parking



Quantifying Bike Parking in the SHOPP Tool

Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
Bike Parking (201.999)	EA	10				10	Bike Corral



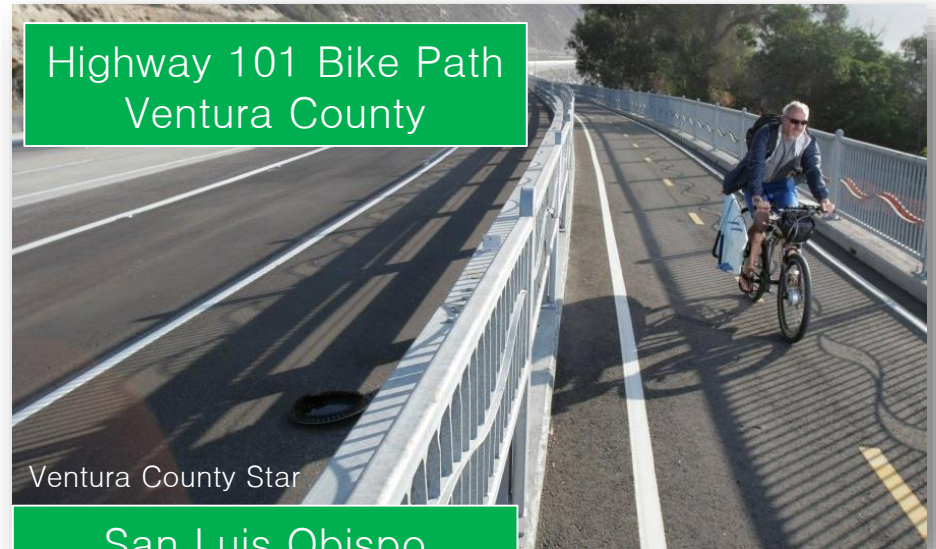
H05: Class I Bike Path

Definition:

- A bicycle facility that is an exclusive right-of-way, as motor vehicles are prohibited.
- Pedestrians may also access the facility if it designed with shoulders.

Guidance:

- Refer to [Highway Design Manual Topic 1003.1: Class I Bikeways \(Bike Paths\)](#)
 - 8 ft. minimum; 10 ft. preferred travel width.
 - 2 ft. shoulders on both sides for pedestrian access.
 - 5 ft. minimum unpaved width between shoulder and edge of highway pavement.



Highway 101 Bike Path
Ventura County

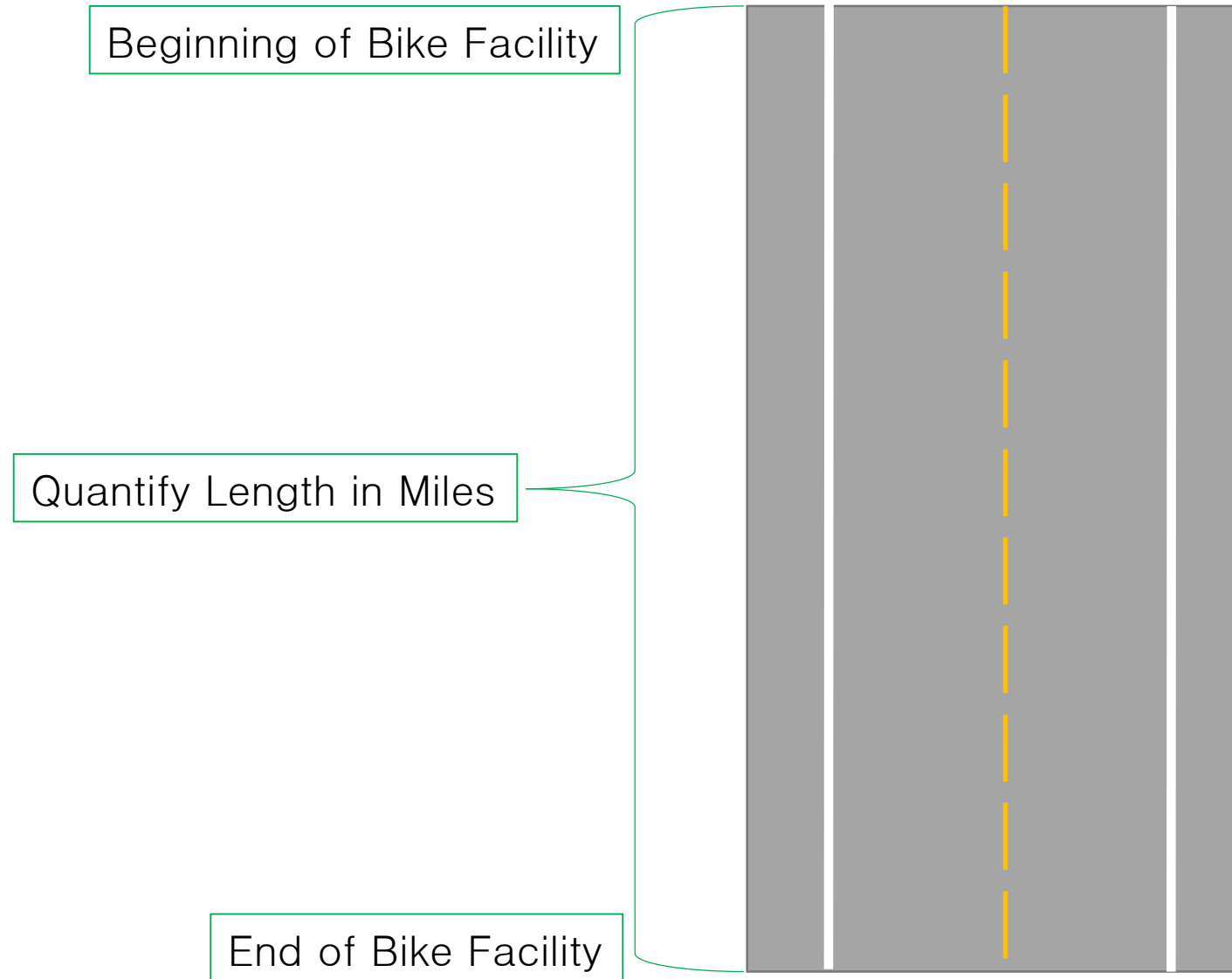
Ventura County Star



San Luis Obispo
Madonna Inn Bike Path
(SR-101 adjacent)

San Luis Obispo
Tribune

Quantifying Class I Bikeways in the SHOPP Tool



H06: Class II Bike Lane

Definition:

- An exclusive lane for bicycle access within the roadway to separate cyclists from the adjacent motor vehicle travel lane and/or parking lane.
- A Buffered Bike Lane (pictured above right) provides an additional 2–3 feet space to further separate cyclists from automobiles.

Guidance:

- Refer to [Highway Design Manual Topic 301.2: Class II Bikeway \(Bike Lane\) Lane Width](#)
 - 4 ft. minimum
 - 5 ft. if next to parked vehicles
 - 6 ft. if 40 MPH posted and above



H07: Class III Bike Route

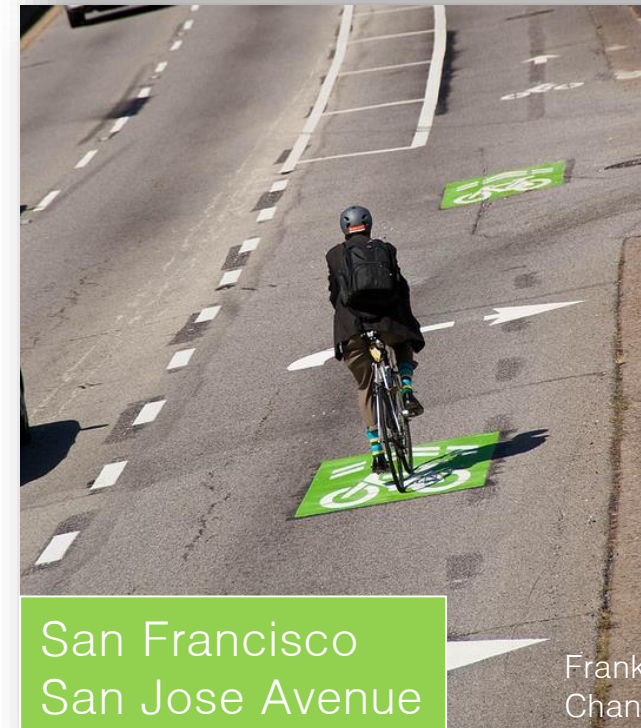


Definition:

- A road that designates— using signing, striping, or volume management— its preferred usage for cyclists.
- Shared-lane markings are used to delineate the preferred path of bicycle travel in a lane shared with automobiles. Per HDM, 35 MPH posted speed or less.

Guidance:

- Refer to [Highway Design Manual Topic 1002.1 \(4\): Class III Bikeway \(Bike Route\)](#) for more information.



H08: Class IV Separated Bikeway

Definition:

- A bikeway that is separated from vehicular traffic using horizontal and vertical elements.
- Separation can be made through:
 - Flexible posts
 - Bollards
 - Parking stops
 - Planters
 - Parked vehicles
 - Raised curbs.

Guidance:

- Refer to [Design Information Bulletin 89](#) and FHWA's [Separated Bike Lane Planning and Design Guidance](#) for more information.

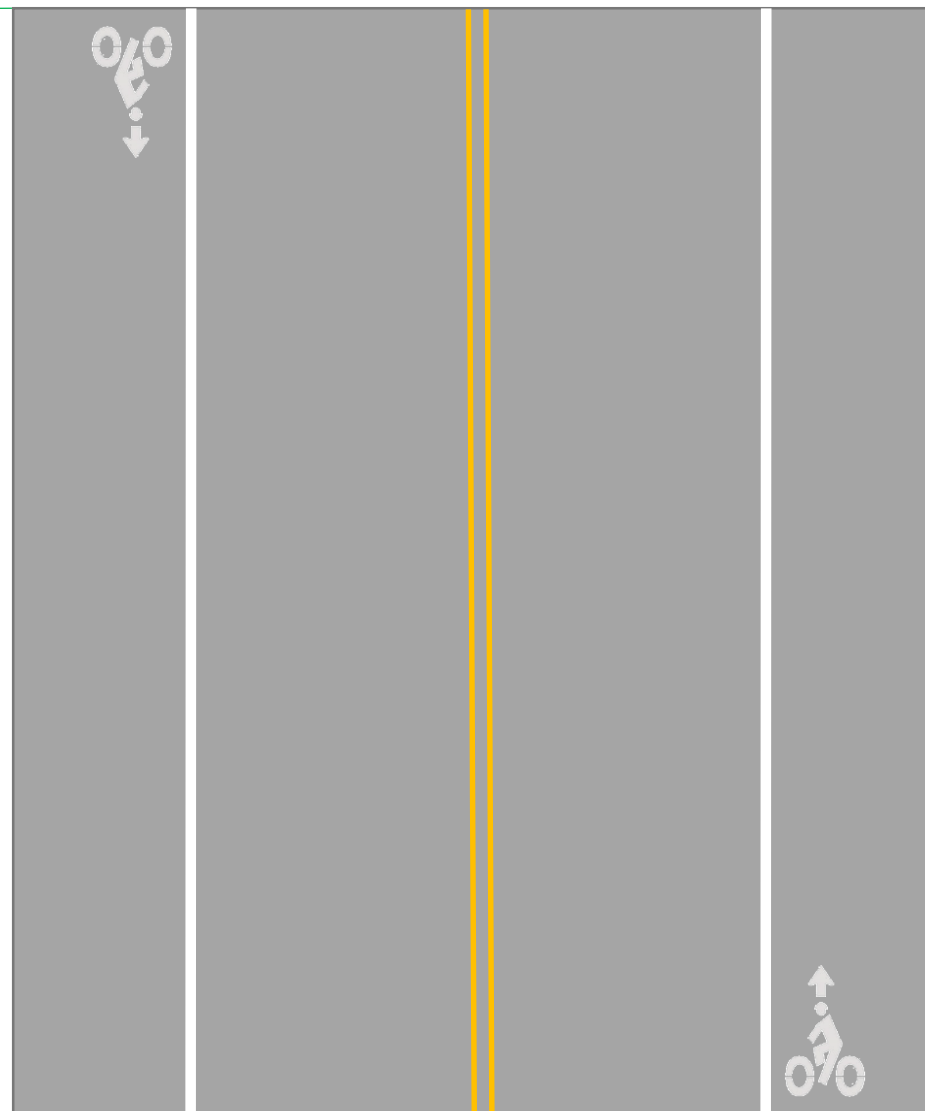


Quantifying Bikeways (Classes II–IV) in the SHOPP Tool

Beginning of Bike Facility

1. Quantify Length in Miles
2. Multiply by 2 if Bike Lane is in both directions

End of Bike Facility



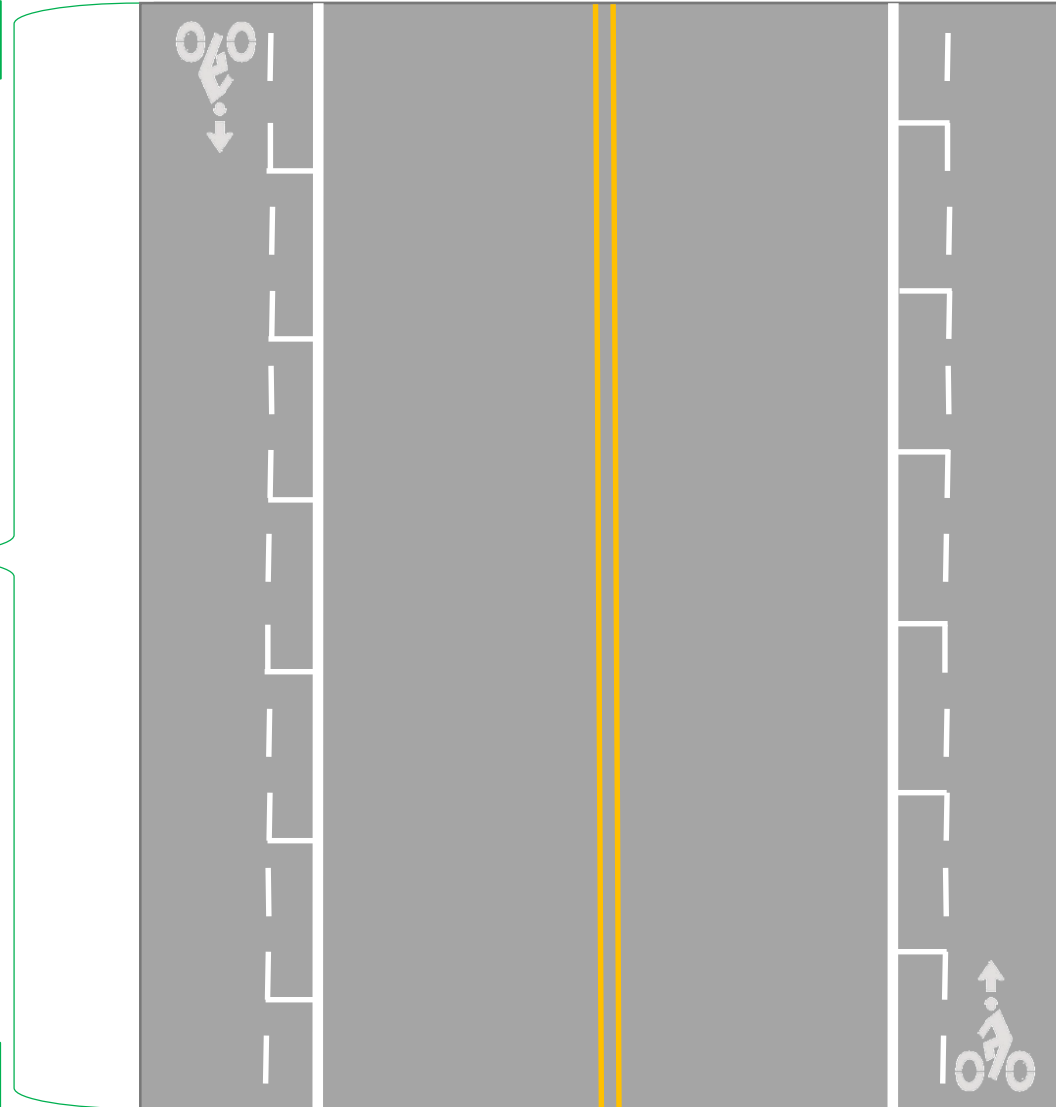
Quantifying Bikeways (Classes II–IV) in the SHOPP Tool

Beginning of Bike Facility

San Francisco
SR-35 Sloat Boulevard

Length: 0.6 Centerline Mile
Class II: 1.2 Lane Miles

End of Bike Facility

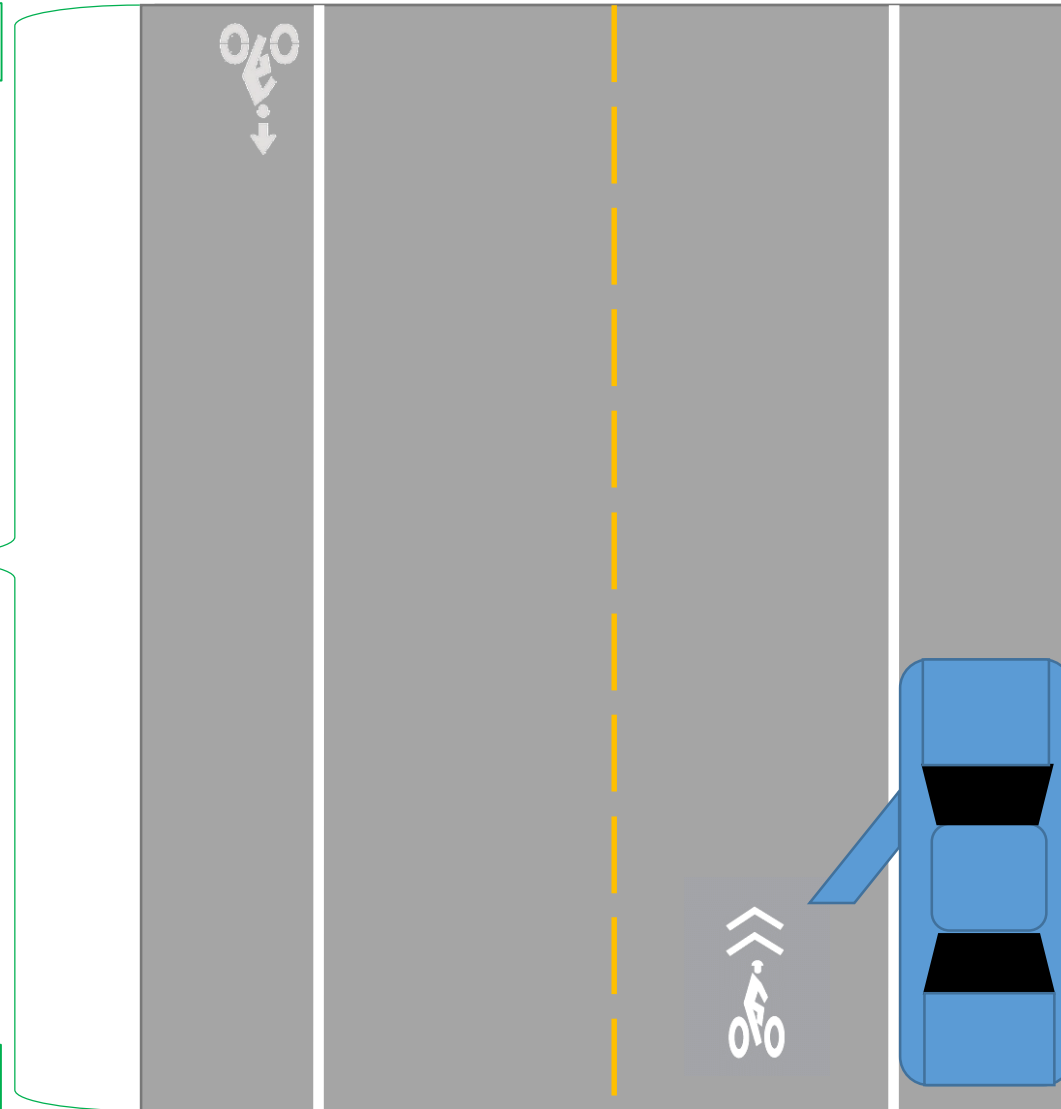


Quantifying Bikeways (Classes II–IV) in the SHOPP Tool

Beginning of Bike Facility

Length: 0.5 Miles
Class II: 0.5 Miles
Class III: 0.5 Miles

End of Bike Facility



Quantifying Bikeways in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
F17	Mobility	Restripe Bikeways (201.310)	Linear Miles						
H05	Streets	Class I Bike Paths (201.999)	Linear Miles						
H06	Streets	Class II Bike Lane (201.999)	Lane Miles						
H07	Streets	Class III Bike Routes (201.999)	Lane Miles						
H08	Streets	Class IV Separated Bikeway (201.999)	Lane Miles						

- Only if Bikeway striping is being maintained.
- Still need to quantify distance, bicycle class and condition.

Quantifying Bikeways in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
F17	Mobility	Restripe Bikeways (201.310)	Linear Miles						
H05	Streets	Class I Bike Paths (201.999)	Linear Miles						
H06	Streets	Class II Bike Lane (201.999)	Lane Miles						
H07	Streets	Class III Bike Routes (201.999)	Lane Miles						
H08	Streets	Class IV Separated Bikeway (201.999)	Lane Miles						

- If **new** construction or striping, select Bikeway class in Streets Category.
- Still need to quantify distance and bicycle class.

of Detection Loops, # of Signals, uni- or bi-directional, Buffered, type of Class IV separation, etc.

H10: Conflict zone green paint

Definition:

- Increases the visibility of the bike facility, thereby increasing bicyclist comfort and motorist yielding behavior.
- Identifies and mitigates potential conflict areas, such as:
 - Right turn pockets
 - Driveways
 - Freeway on-ramps and off-ramps
 - Intersections
 - Beginning of bike lane

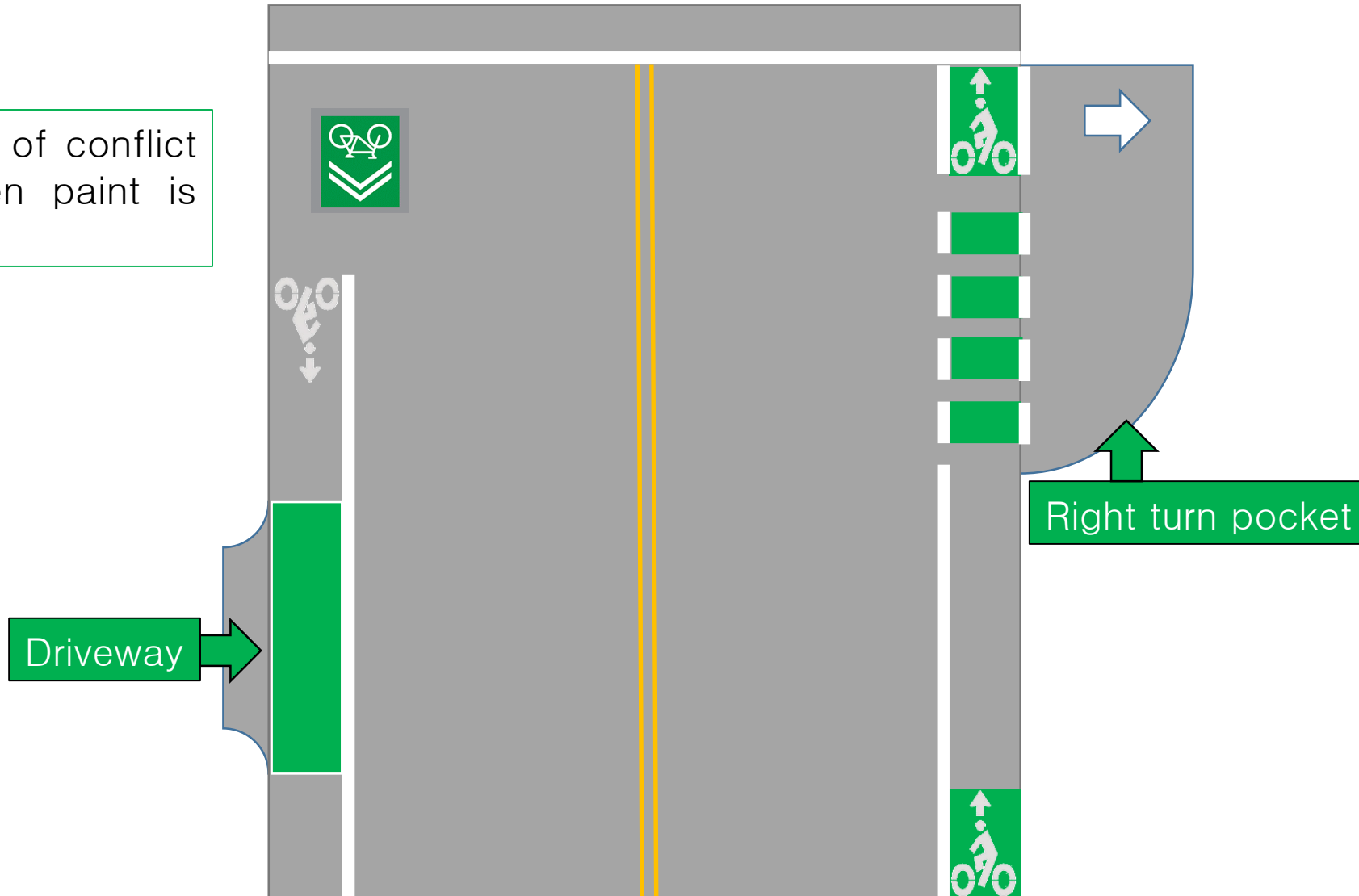
Guidance:

- Interim approval (IA-14) from MUTCD for the use of green paint.

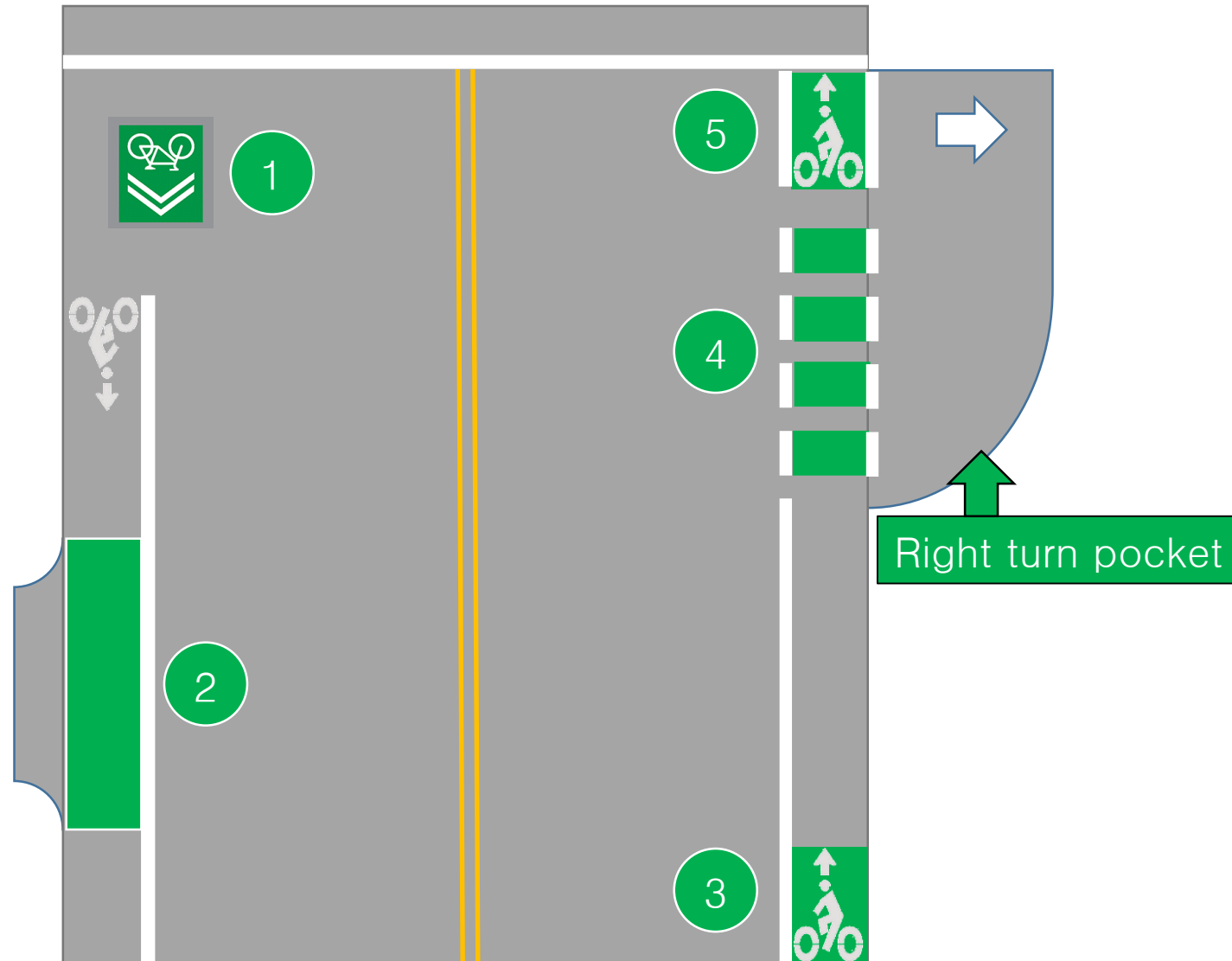


Quantifying conflict zone green paint in the SHOPP Tool

Count the number of conflict zones where green paint is applied



Quantifying conflict zone green paint in the SHOPP Tool



H13: Crosswalks

Definition:

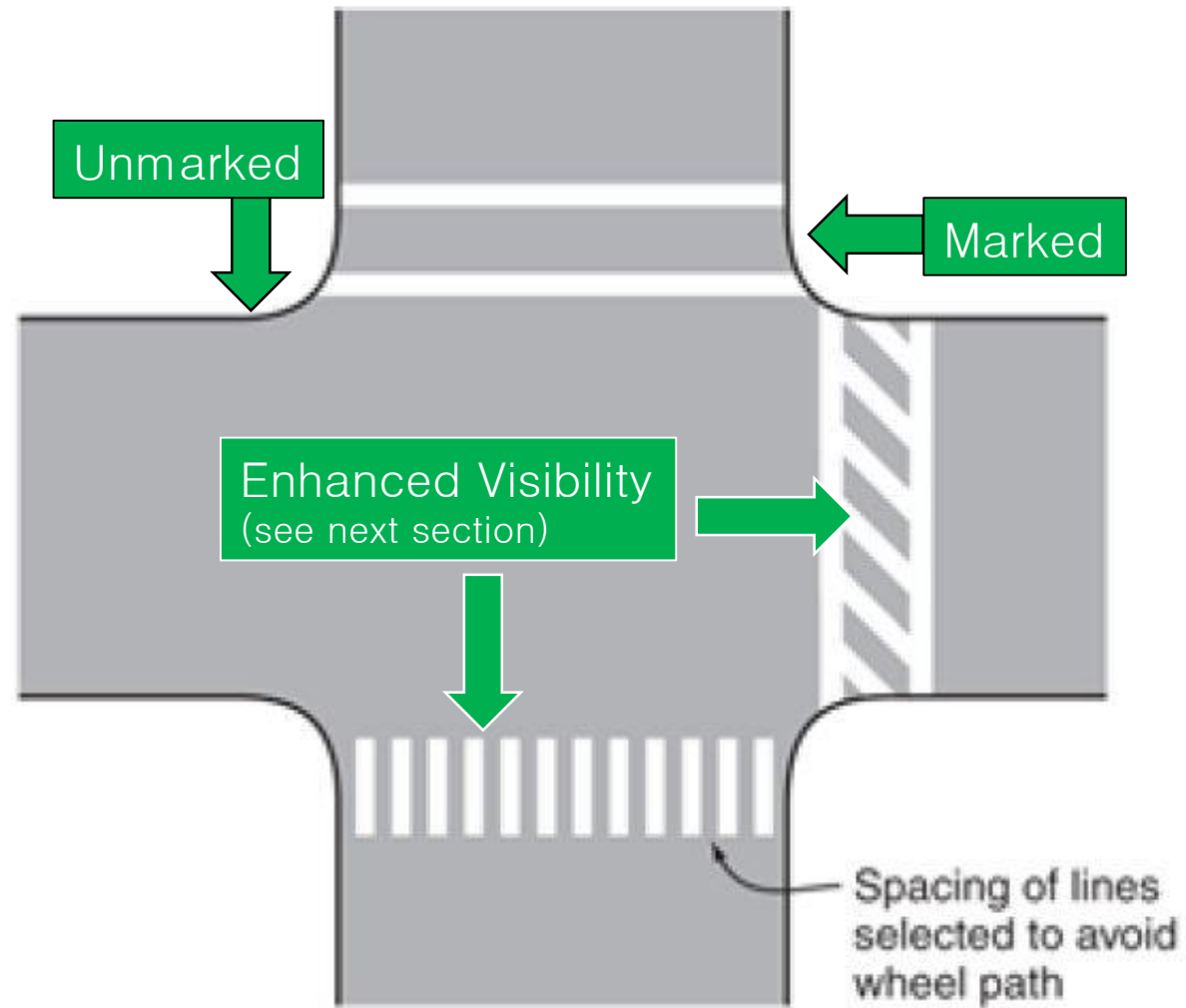
- Marked crosswalks define paths at preferred crossing locations, give guidance for pedestrians, and help establish motorist right-of-way to yield to pedestrians.

Guidance:

- Marked crosswalks are preferred over unmarked crosswalks, but additional countermeasures should be included whenever possible (see Enhanced Crosswalk Visibility).
- Refer to [MUTCD 3B-19](#) and [NACTO](#) for more information.



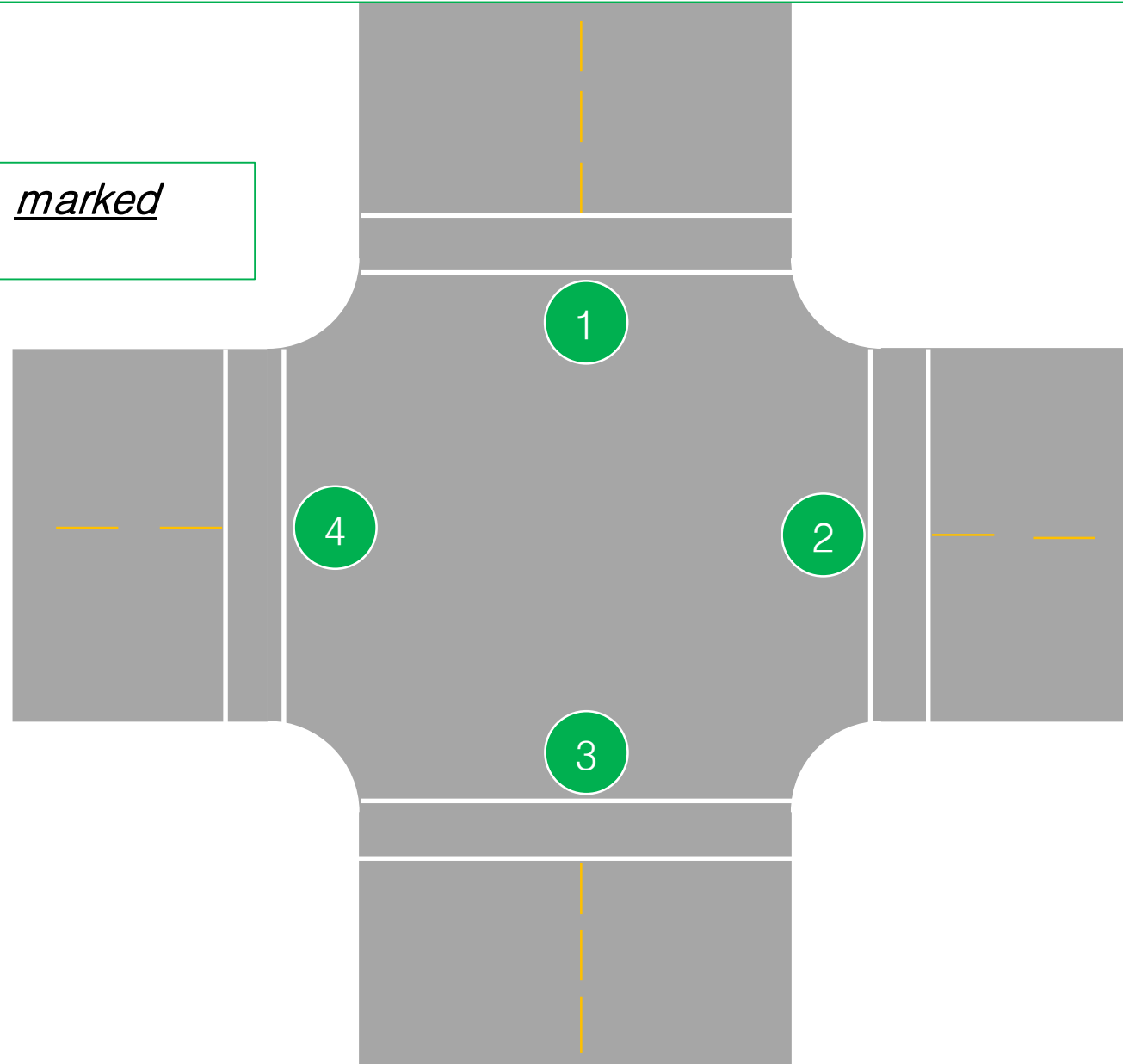
H13: Crosswalks



[MUTCD Figure 3B.19](#)

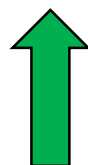
Quantifying Crosswalks in the SHOPP Tool

Quantify each leg of a marked crosswalk individually



Quantifying Crosswalks in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H13	Streets	Crosswalk (201.999)	EA	4				4	4 new marked crosswalks



H12: Enhanced Crosswalk Visibility

Crosswalk Definition:

- Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface (HDM 62.4).

Enhanced Crosswalk Visibility Definition:

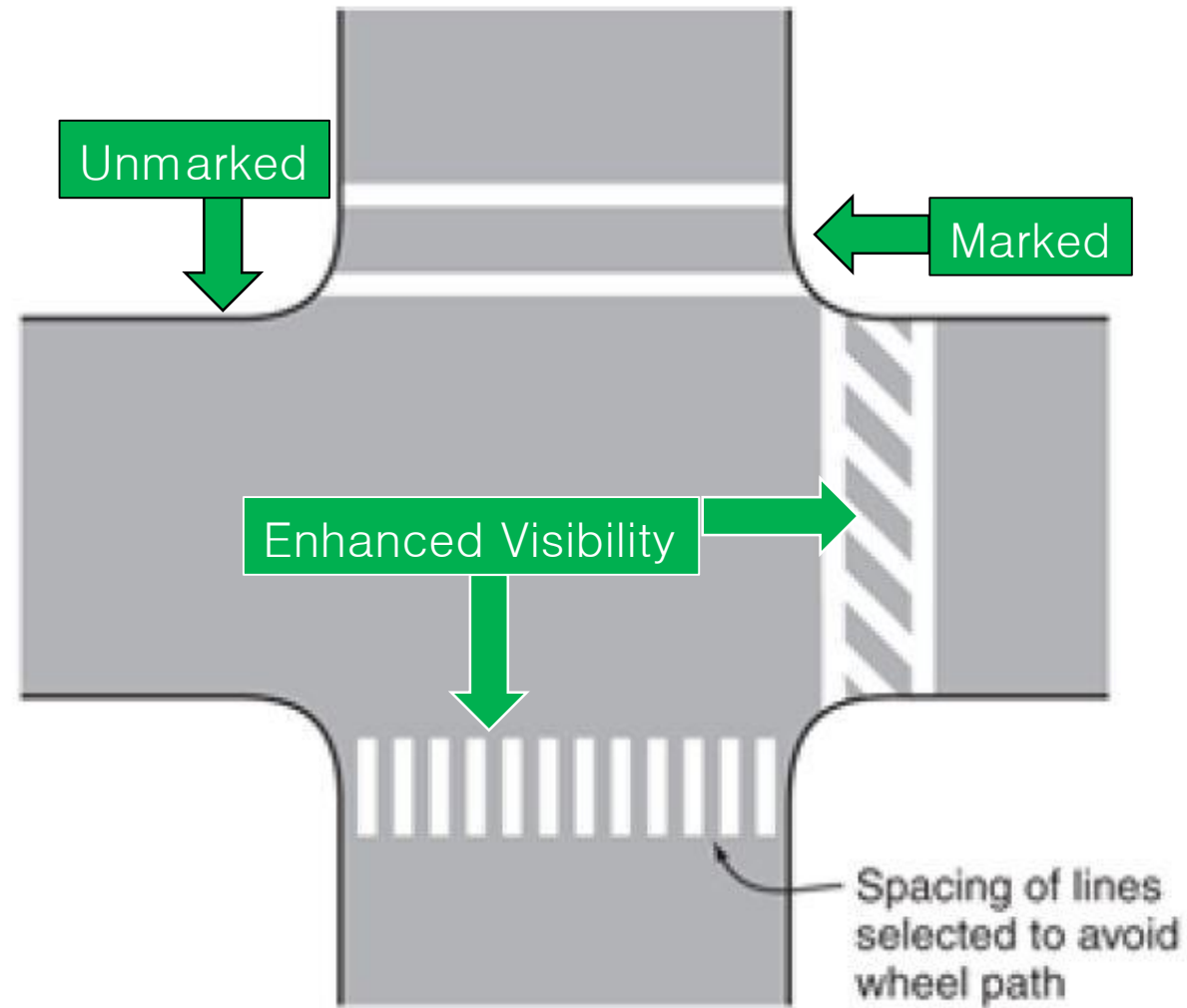
- Additional elements that increase the visibility of the Pedestrian Right of Way.

Guidance:

- Consider land use, demand, pedestrian compliance, speed, safety, and crash history (NACTO).



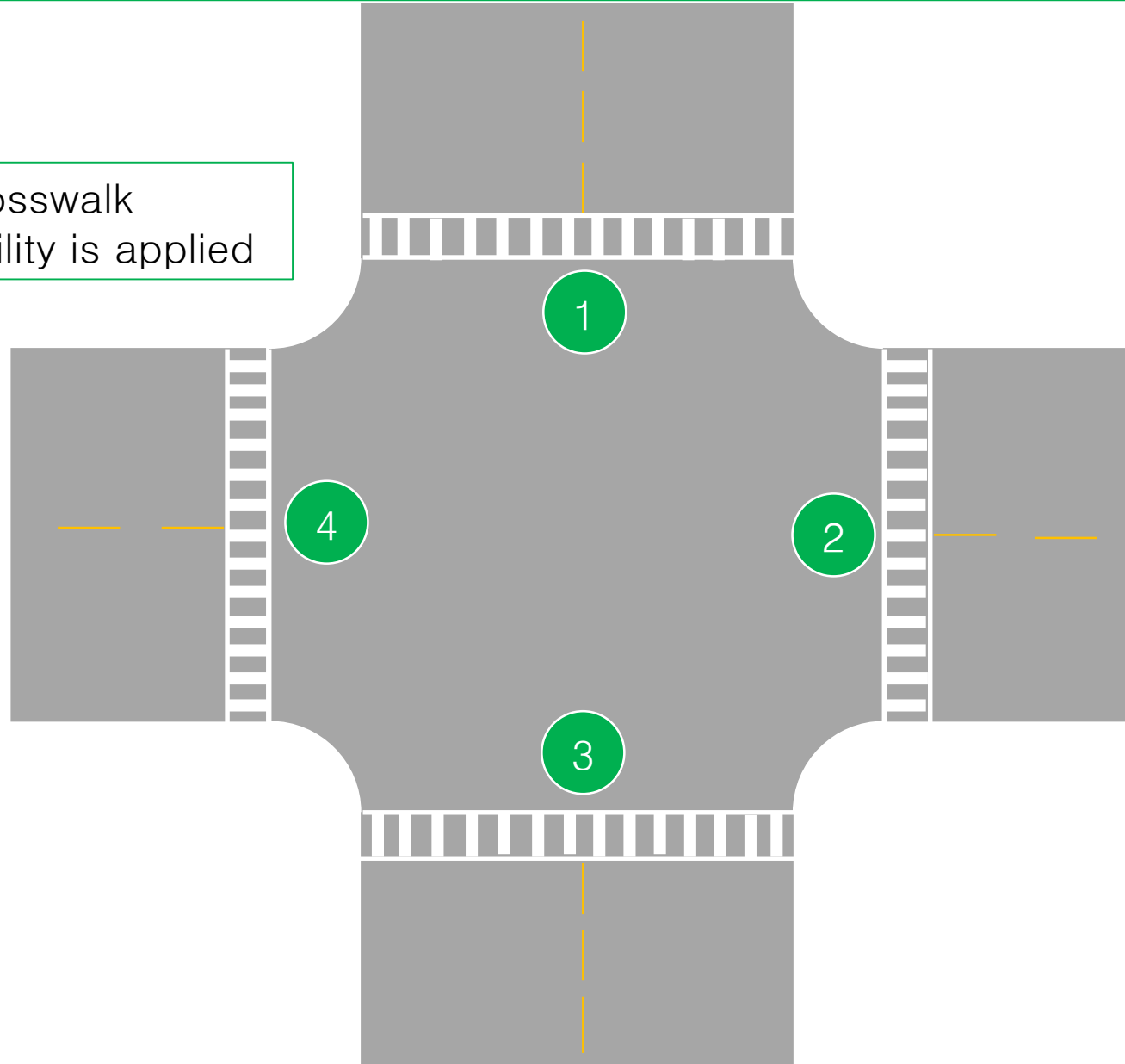
H12: Enhanced Crosswalk Visibility



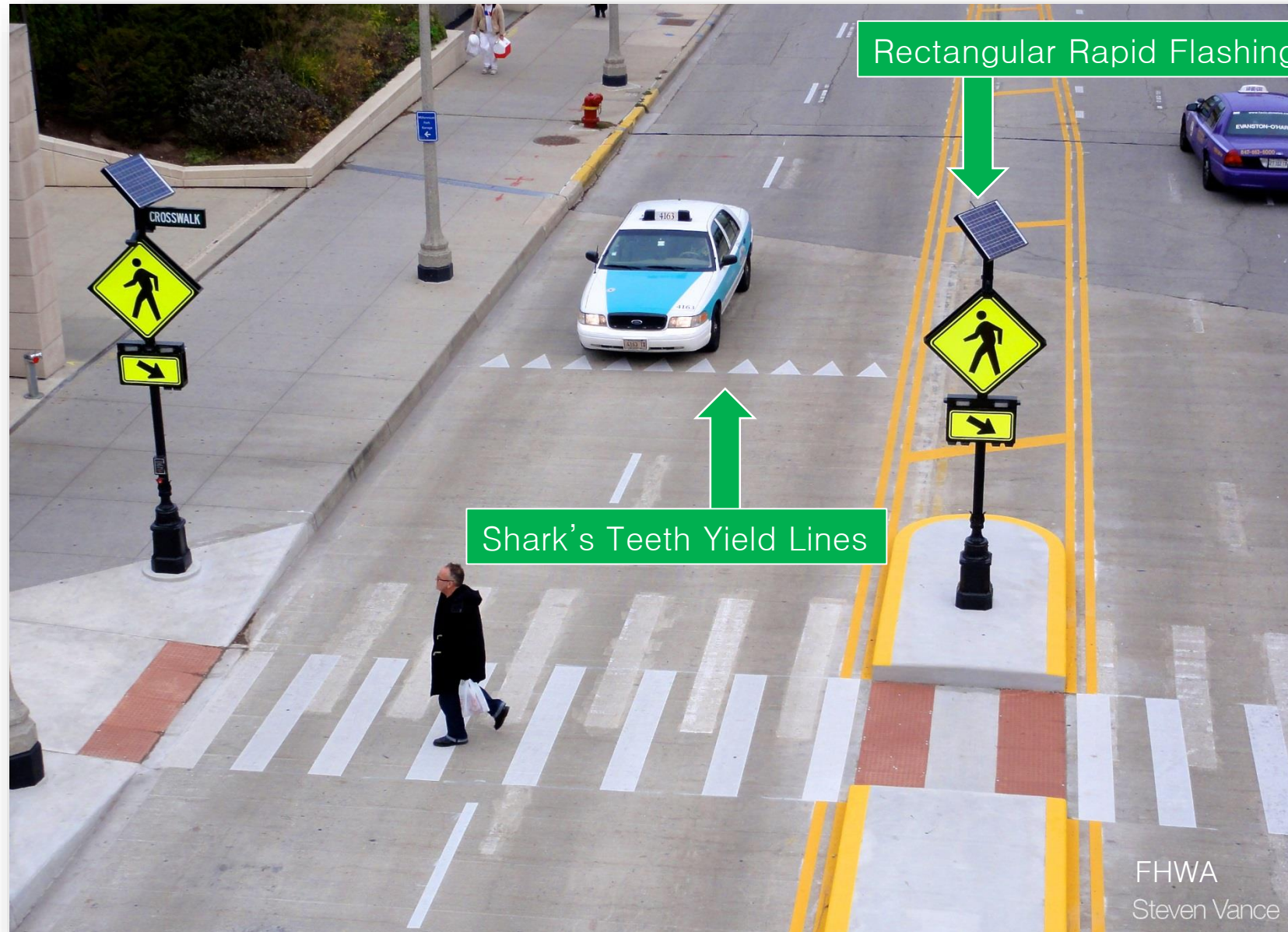
[MUTCD Figure 3B.19](#)

Quantifying Enhanced Crosswalk Visibility in the SHOPP Tool

Quantify per leg of crosswalk
Where enhanced visibility is applied



H12: Enhanced Crosswalk Visibility– Additional Features



Quantifying Enhanced Crosswalk Visibility in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H12	Streets	Enhanced Crosswalk Visibility (201.999)	EA	4				4	Ladder striping, RRFB, advanced yield lines



4 New Enhanced
Visibility Crosswalks

H11: Crossing Islands

Definition:

- An area within the median for pedestrian refuge from exposure to traffic while crossing the roadway.
- Allows pedestrian to cross fewer lanes at a time while judging conflicts separately.

Guidance:

- Should be provided at mid-block, unsignalized crossings
- Bicycle crossings should line up with the bicycle path of travel and not require cyclists to use the pedestrian crosswalk.
- Provide at least 6 feet in the direction of pedestrian travel.
- See [DIB 82](#) and [HDM 405.4](#) for more detailed information.



H11: Crossing Islands

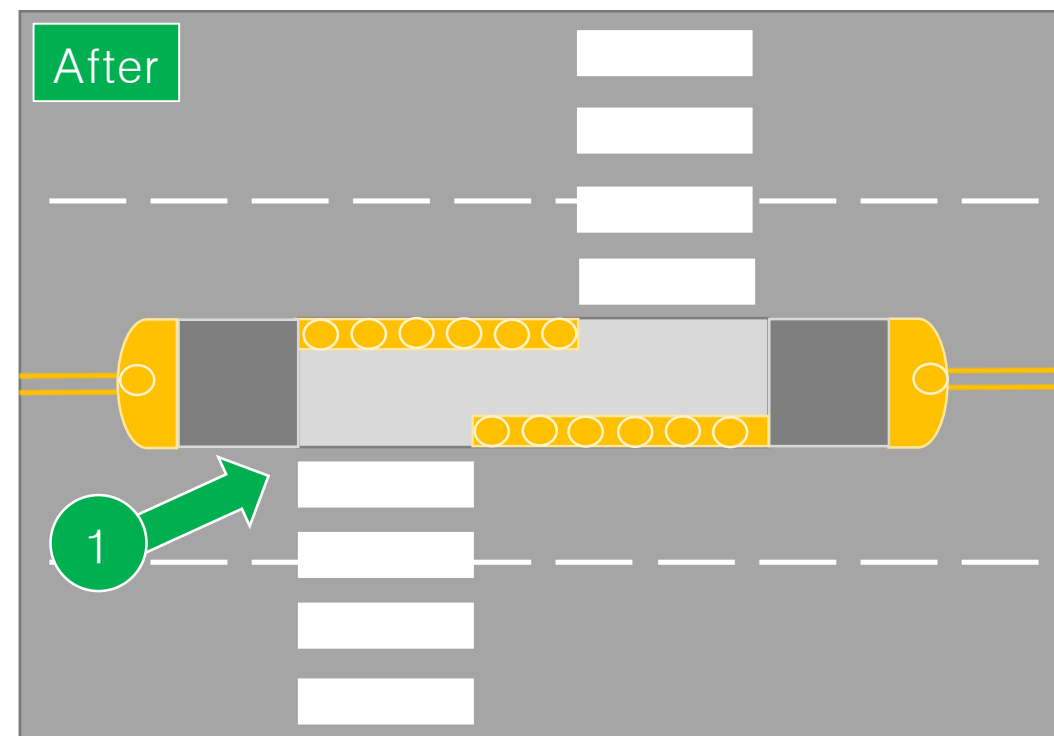
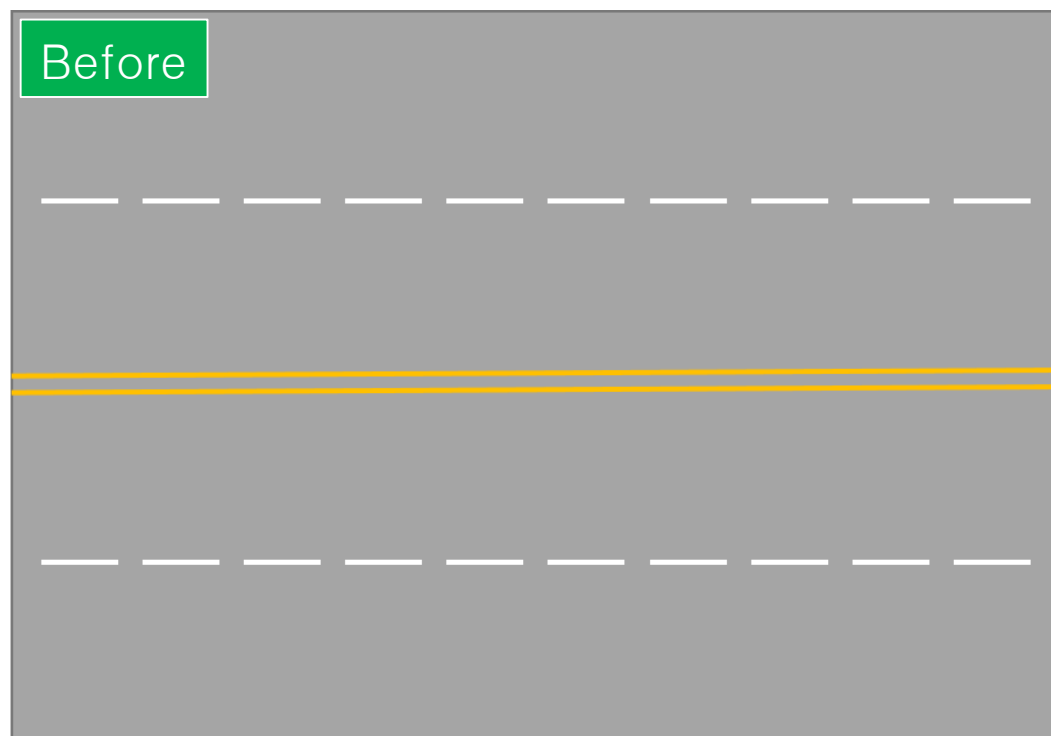
Danish Offset Crossing:

- A crossing island which channelizes pedestrians in the direction of oncoming traffic to ensure they look at oncoming vehicles while traveling within the median.
- Increase motorist yielding rates as well as pedestrian safety.
- More information on pedestrian crossing safety can be accessed on FHWA's website:
 - [Evaluating Pedestrian Safety Countermeasures](#)
 - [Proven Countermeasures for Pedestrian Safety](#)
 - [Pedestrian Crossing Infrastructure](#)

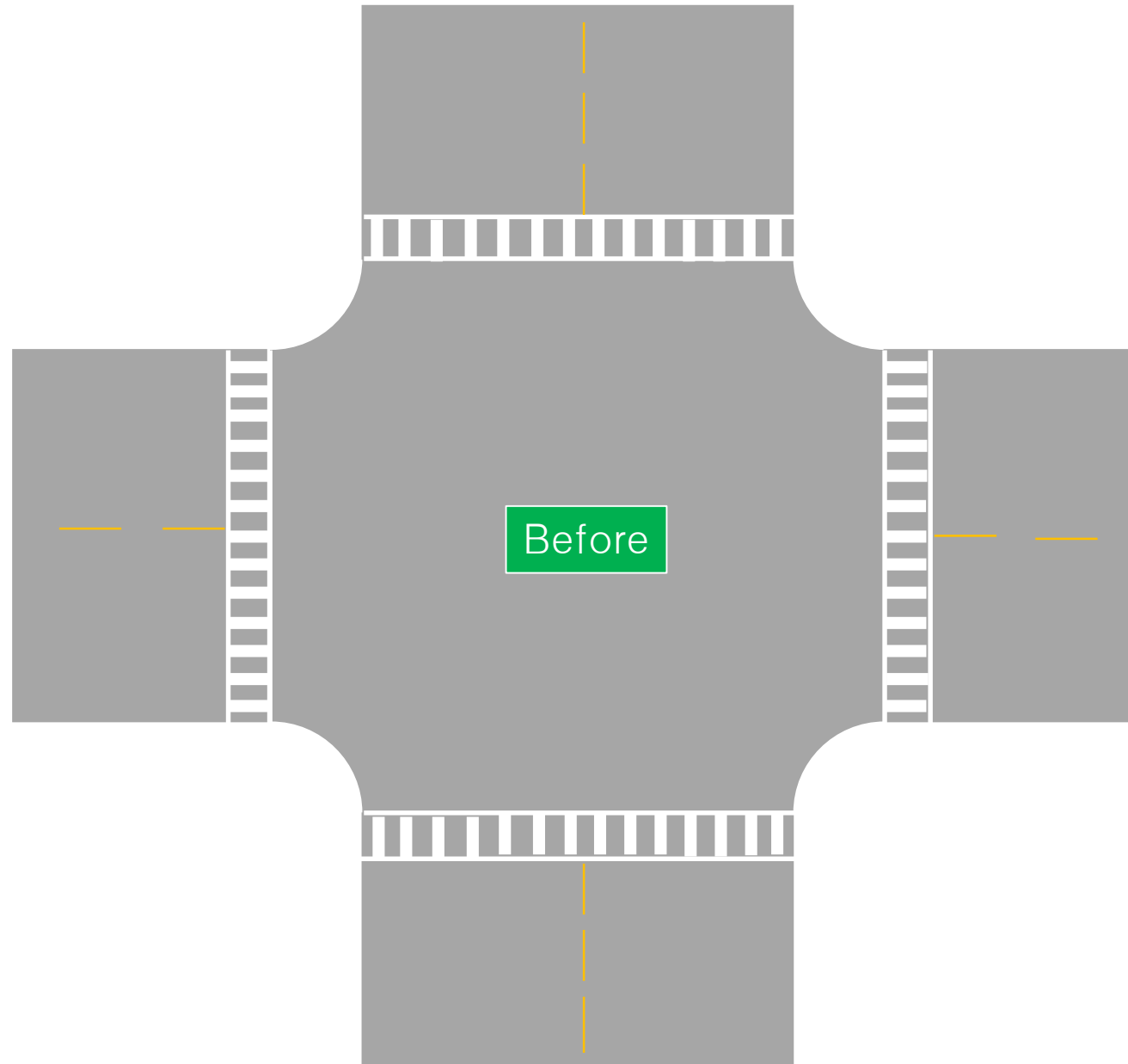


Quantifying Crossing Islands in the SHOPP Tool

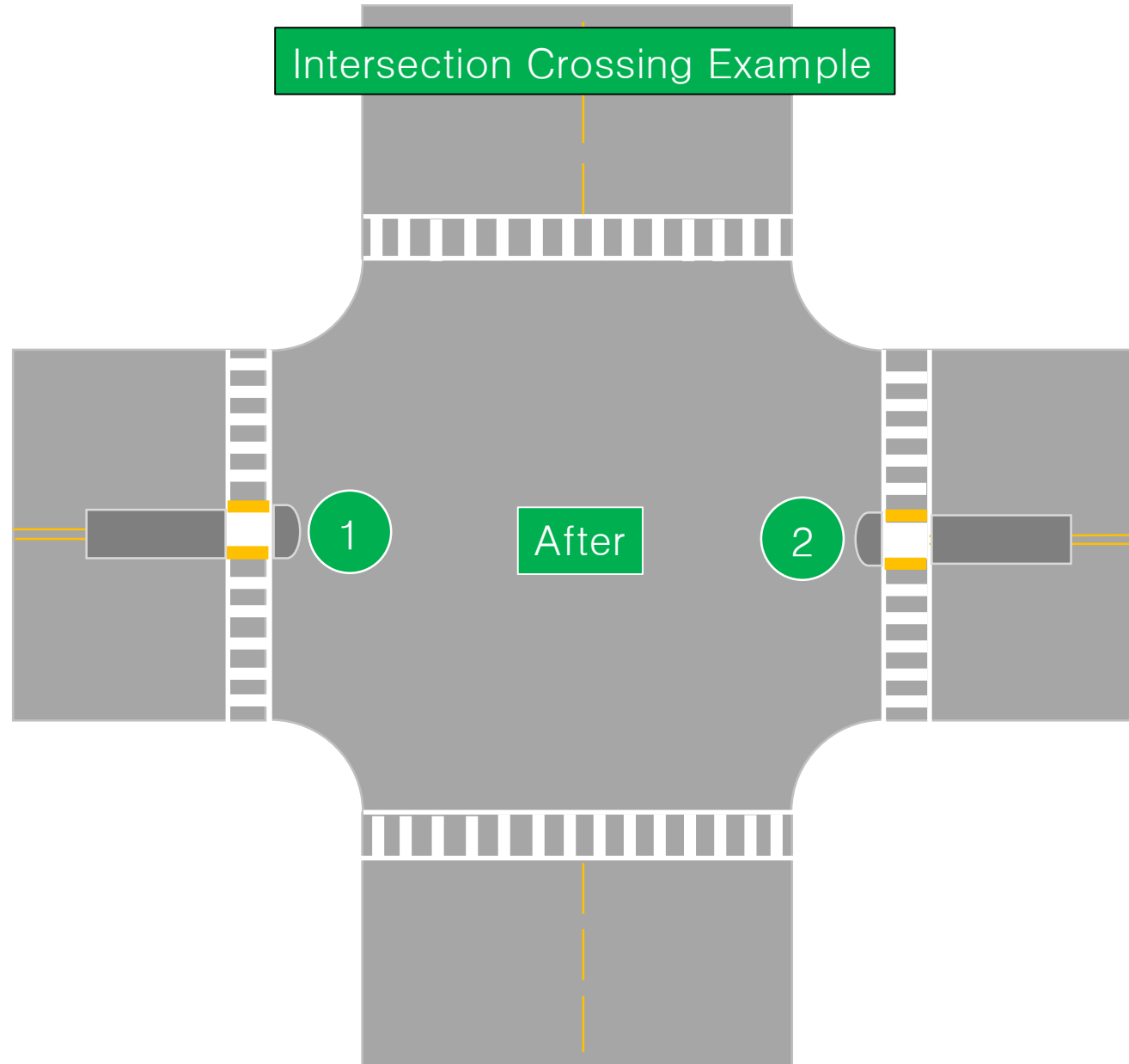
Mid-Block Crossing Example



Quantifying Crossing Islands in the SHOPP Tool



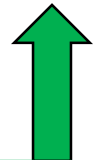
Quantifying Crossing Islands in the SHOPP Tool



Quantifying Crossing Islands in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H11	Streets	Crossing Islands (201.999)	EA	2				2	Intersection crossing

Location of crossing



H14: Curb Extensions/Bulb-Outs

Definition:

- An extension of the sidewalk into the roadway which provides queuing space, increases visibility, and shortens crossing distances.

Guidance:

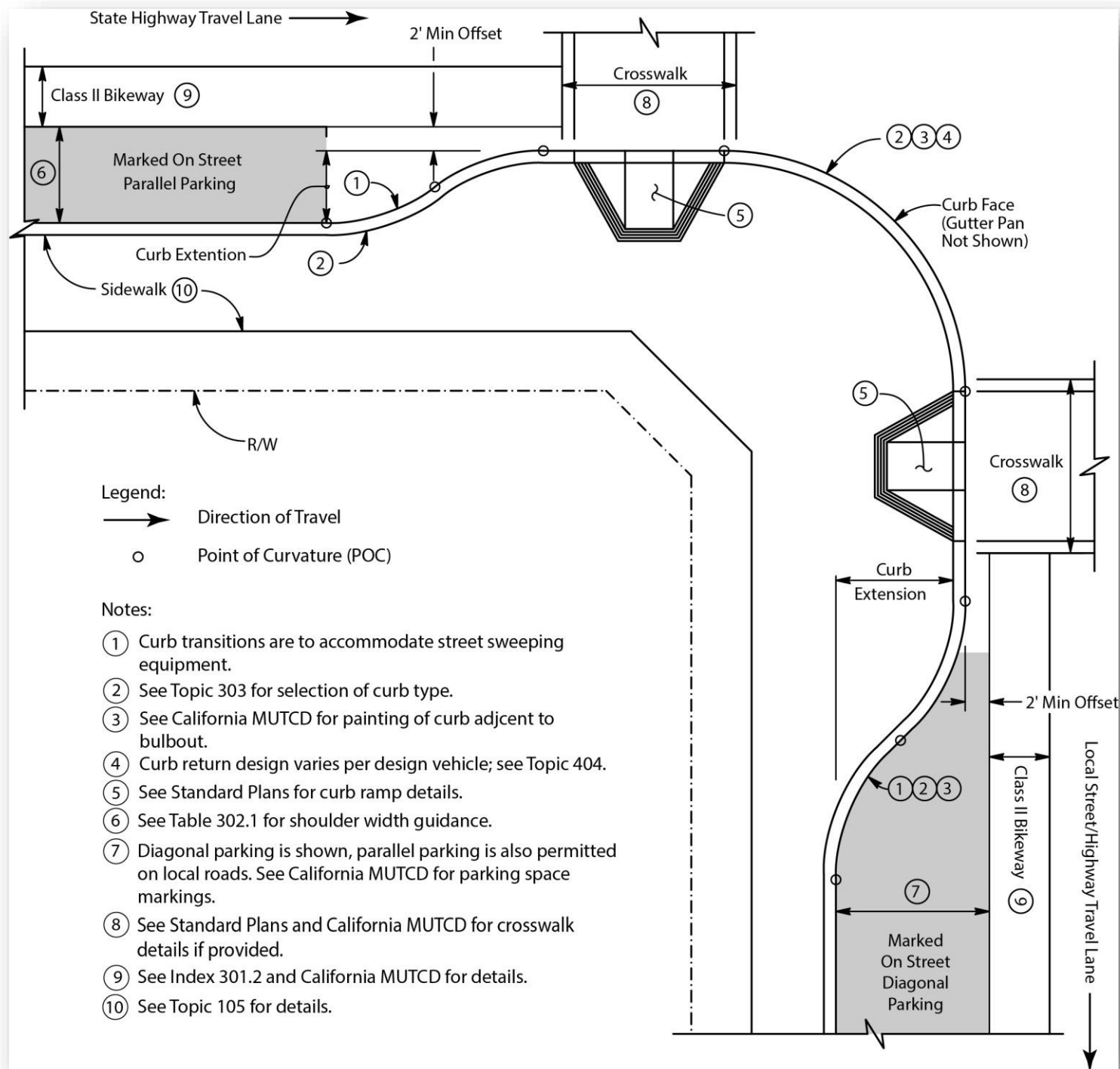
- Bulb-outs should be placed at all corners of an intersection.
- Mid-block locations: bulb-outs should be used on both sides of the street.
- See [HDM 303.4](#), [DIB 82-05](#)
- [NACTO](#)



HDM

Figure 303.4 A

Typical Bulbout with
Class II Bikeway
(Bike Lane)



H14: Curb Extensions/Bulb-Outs



Quantifying Curb Extensions/Bulb-Outs in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H14	Streets	Curb Extensions/Bulbouts (201.999)	EA	4				4	4 new bulbouts added to corners of intersection



H17: LED Lighting in Pedestrian and Bicycle Accessible Areas

Definition:

- The illumination of bicycle and pedestrian facilities using LED lights to increase visibility, security, safety, and awareness of all road users.
- Increases awareness of bicycle facility conflicts and obstacles.

Guidance:

- Pedestrian and Bicycle facilities should be well lit.
- Commercial Districts and wide streets should have lighting on both sides of the street.
- Refer to [HDM 1003.1 \(17\)](#) for more information.



NACTO

H17: LED Lighting in Pedestrian and Bicycle Accessible Areas

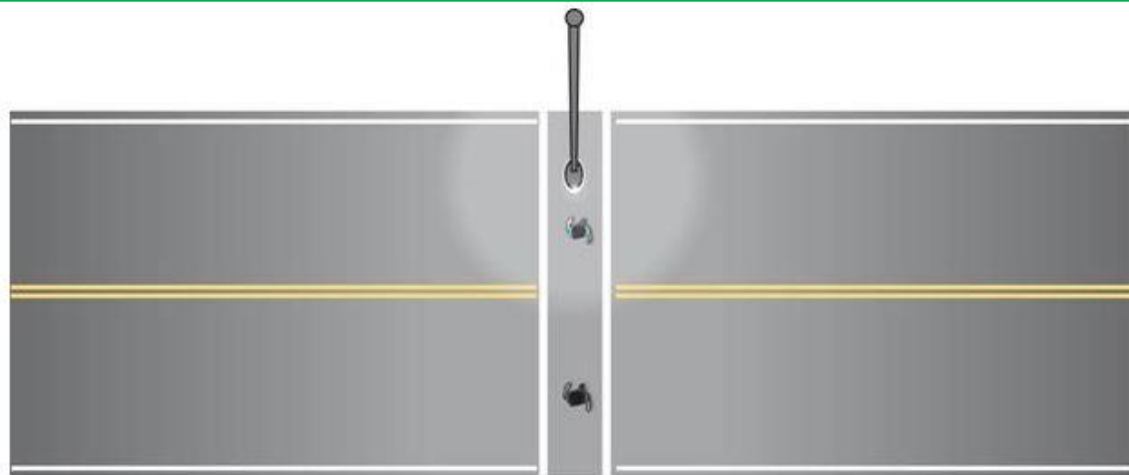


Figure 11. Drawing. Traditional midblock crosswalk lighting layout.

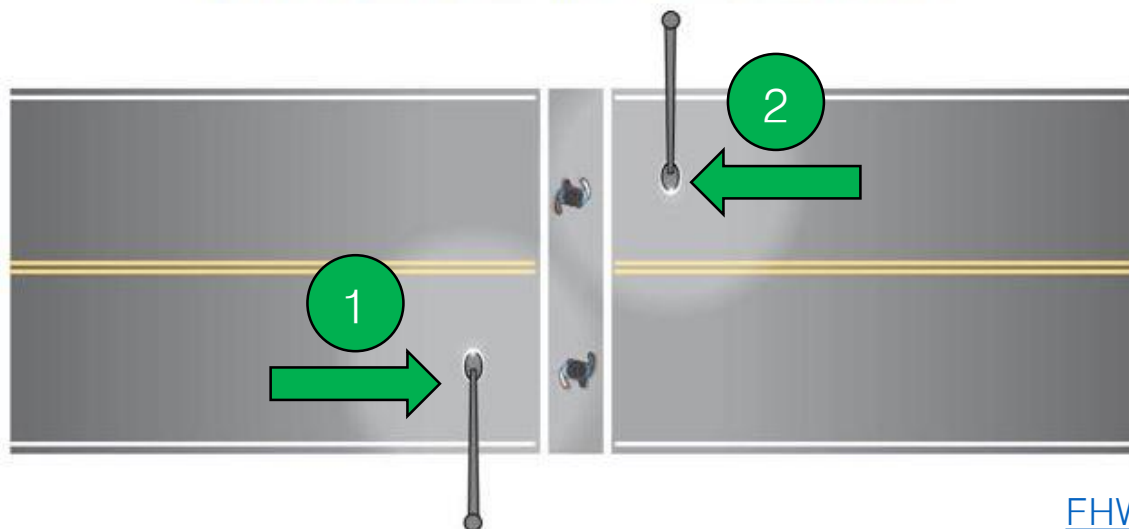


Figure 12. Drawing. New design for midblock crosswalk lighting layout.

[FHWA](#)

Strategic lighting in midblock crossings increases pedestrian visibility to motorists.

Quantifying LED Lighting in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H17	Streets	LED Lighting (201.999)	EA	2				2	2 new lights illuminate peds in crosswalk



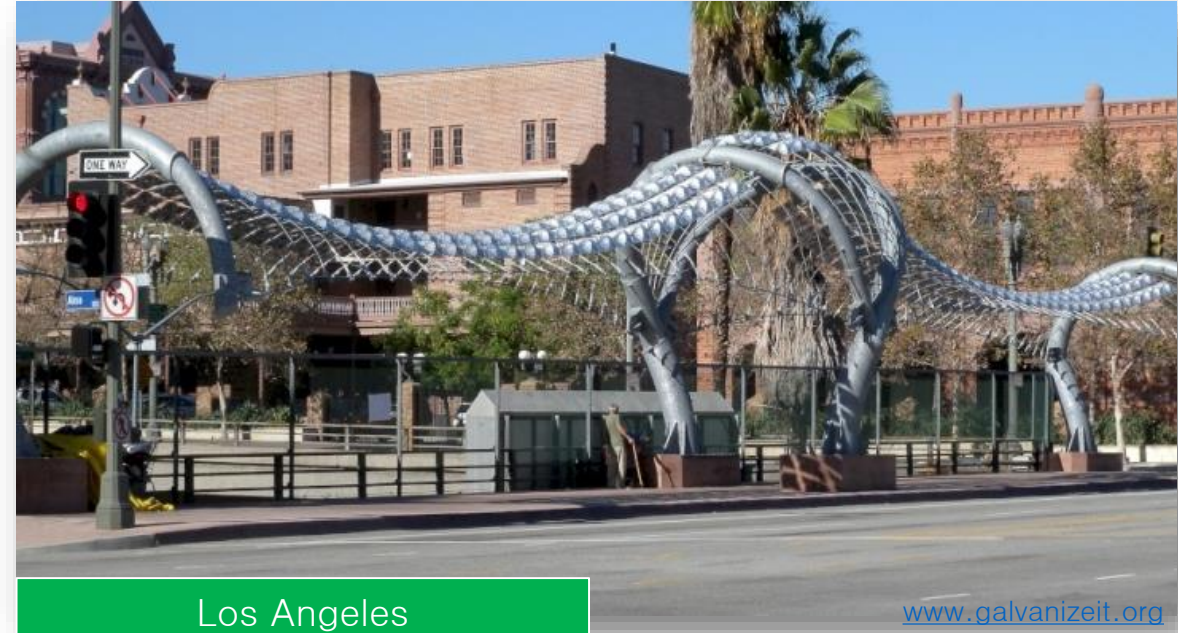
H20: Install Shade for Pedestrian Access

Definition:

- A structure located or constructed within a pedestrian facility that provides shade to users.
- Reduces effects of heat and increases pedestrian comfort.

Guidance:

- Refer to [HDM Chapter 900](#) for more information.

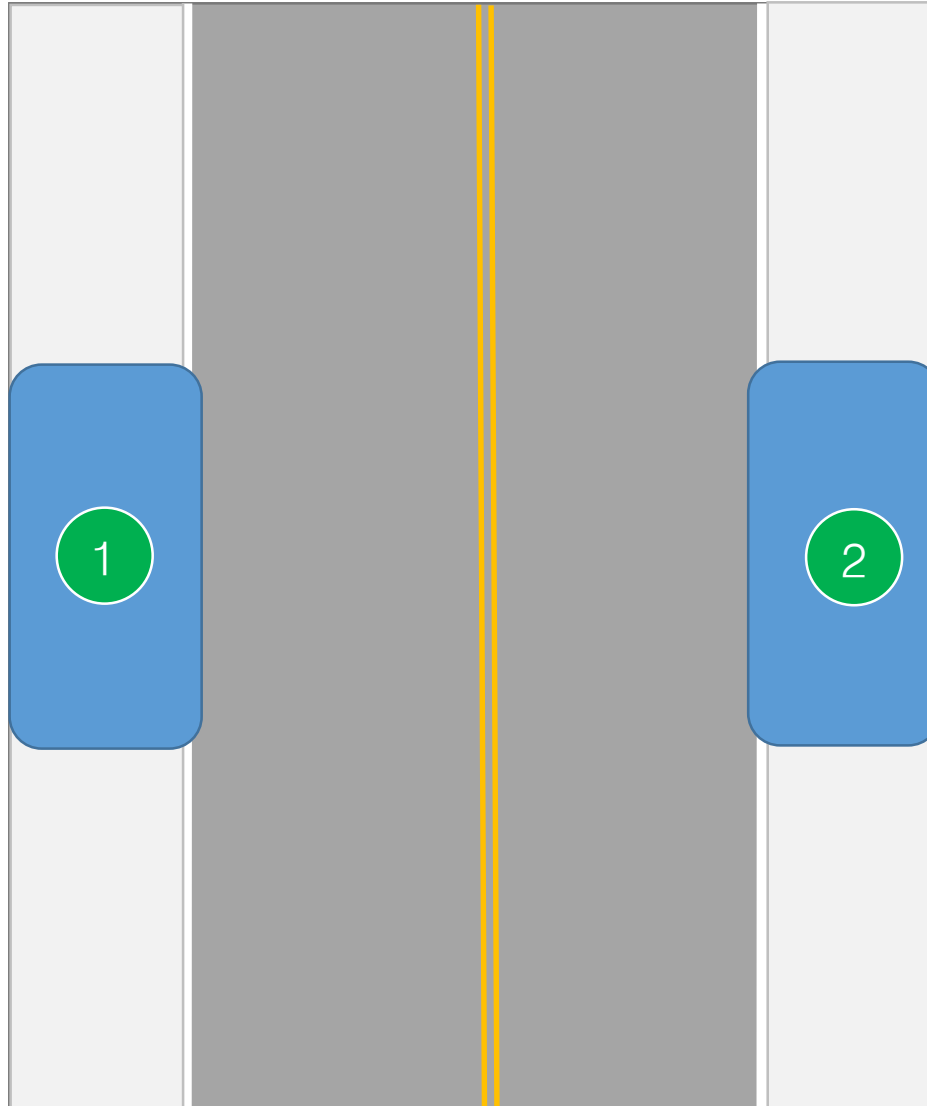


Los Angeles
SR-101 Freeway Overcrossing



Quantifying Install Shade for Pedestrian Access in the SHOPP Tool

- Quantify number of shade structures provided.



Quantifying Install Shade for Pedestrian Access in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H20	Streets	Install Shade for Pedestrian access (201.999)	EA	2				2	

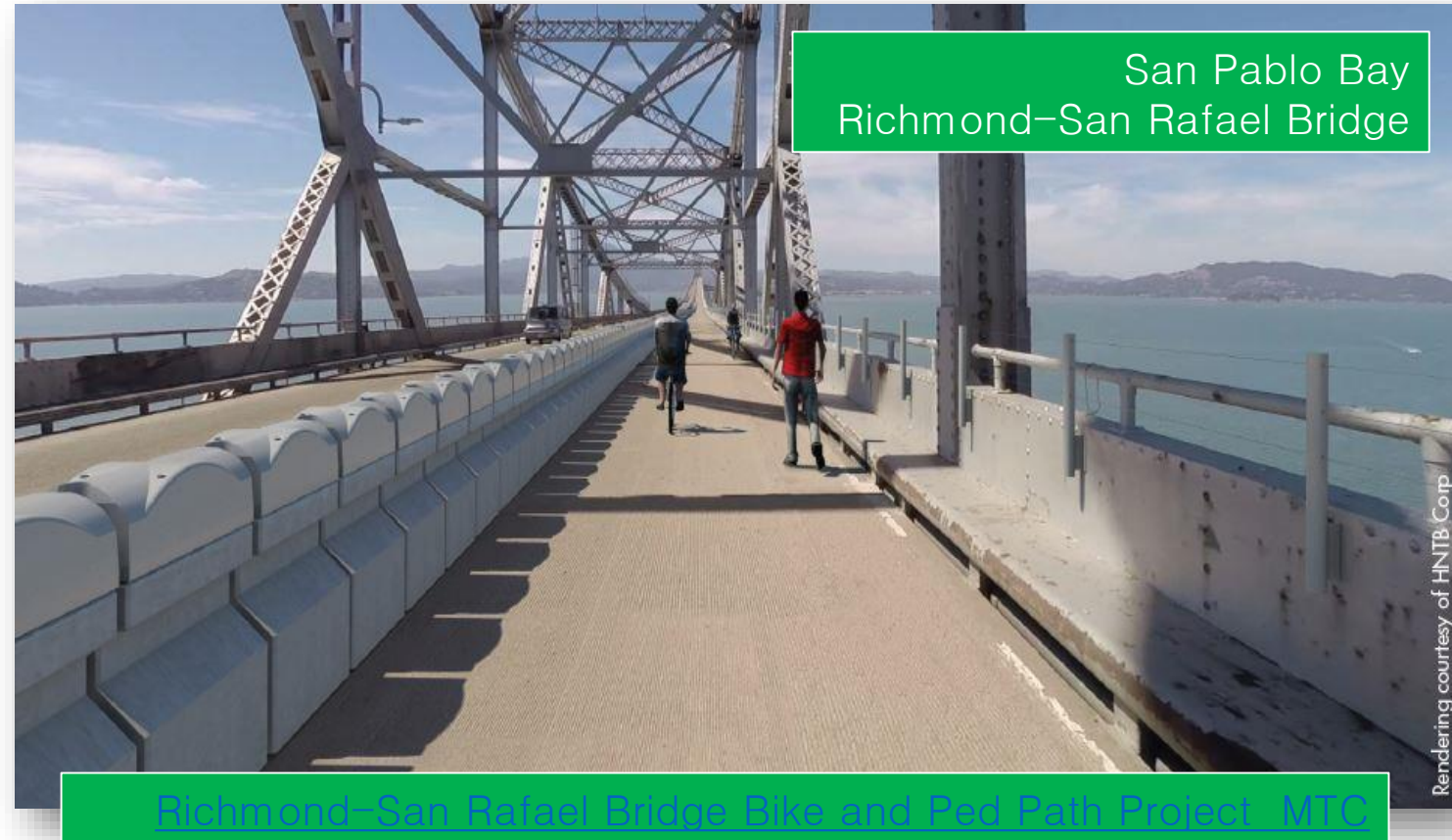
H03: Bridge Access– Bike, Ped, ADA

Definition:

- Access for pedestrians, cyclists, and ADA on a bridge that is on the state highway or goes over a state highway.

Guidance:

- Sidewalk minimum 6 feet wide.
 - Recommended 8 feet wide for pedestrian comfort.
- Consider safety and accessibility at bridge approaches.
- Refer to [HDM Topic 208.4 – Bridge Sidewalks](#) for more information.



H03: Bridge Access– Bike, Ped, ADA

Richmond–San Rafael Bridge Access Improvement Project:

- 10 feet wide Class I separated bicycle path– suitable for two way cycling.
- Path gap closure along I-580 between Marin and Contra Costa Counties



Quantifying Bridge Access in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H03	Streets	Bridge Access – Bike, Ped, ADA (201.999)	EA	1				1	Bike and ped path, movable barrier
H09	Streets	Path Gap Closure	EA	5				5	



H09: Bike/Pedestrian Facility Gap Closure

Definition:

- When a project makes a critical connection between two or more separate pedestrian or bicycle facilities.
 - The gap can be point-specific (**spot gap**), a missing link (**linear gap**), or district-wide (**area gap**).
- Creates a pedestrian or bicycle network, providing access to more destinations.
- Can connect gaps in the project facility or to intersecting network facilities.
- Can connect pedestrian or bicycle facilities.

Oakland
Telegraph Avenue (before)

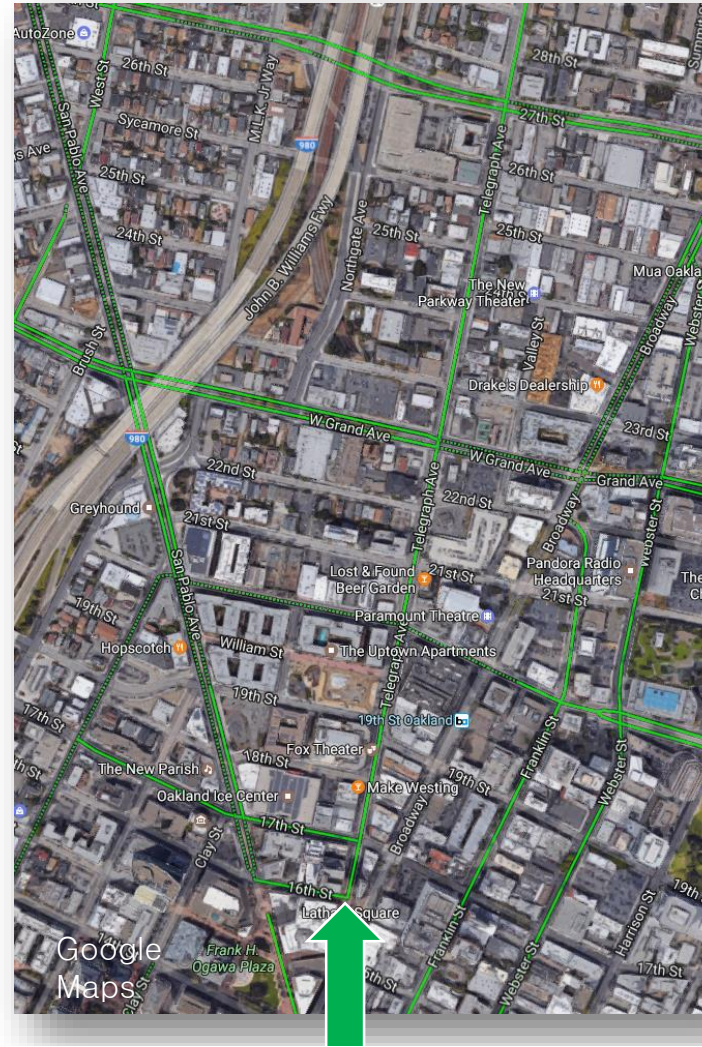


Oakland
Telegraph Avenue (after)

H09: Bike/Pedestrian Facility Gap Closure

Example: Telegraph Avenue

- Length: 0.6 miles
- Project Complete Streets Elements:
 - Road Diet
 - Class IV Protected Bikeways
 - Conflict Zone Green Paint
 - Enhanced Crosswalk Visibility
 - Bike Parking
- Connections to:
 - Bikeway facilities on Telegraph Avenue (south of the project), Grand Avenue, 20th and 27th Streets
 - Dense, urban commercial corridor
 - High quality transit: BART, AC Transit bus routes 6, 800



Telegraph Avenue:
Bicycle Network Gap Connector



H09: Bike/Pedestrian Facility Gap Closure

Telegraph Avenue Results

Indicator	Percent Change
Bicycle Trips	78% Increase
Walking Trips	100% Increase
Traffic Collisions	40% Decrease
Retail Sales	9% Increase
Median Car Speed	25 MPH (Posted Speed Limit)

Source: People for Bikes

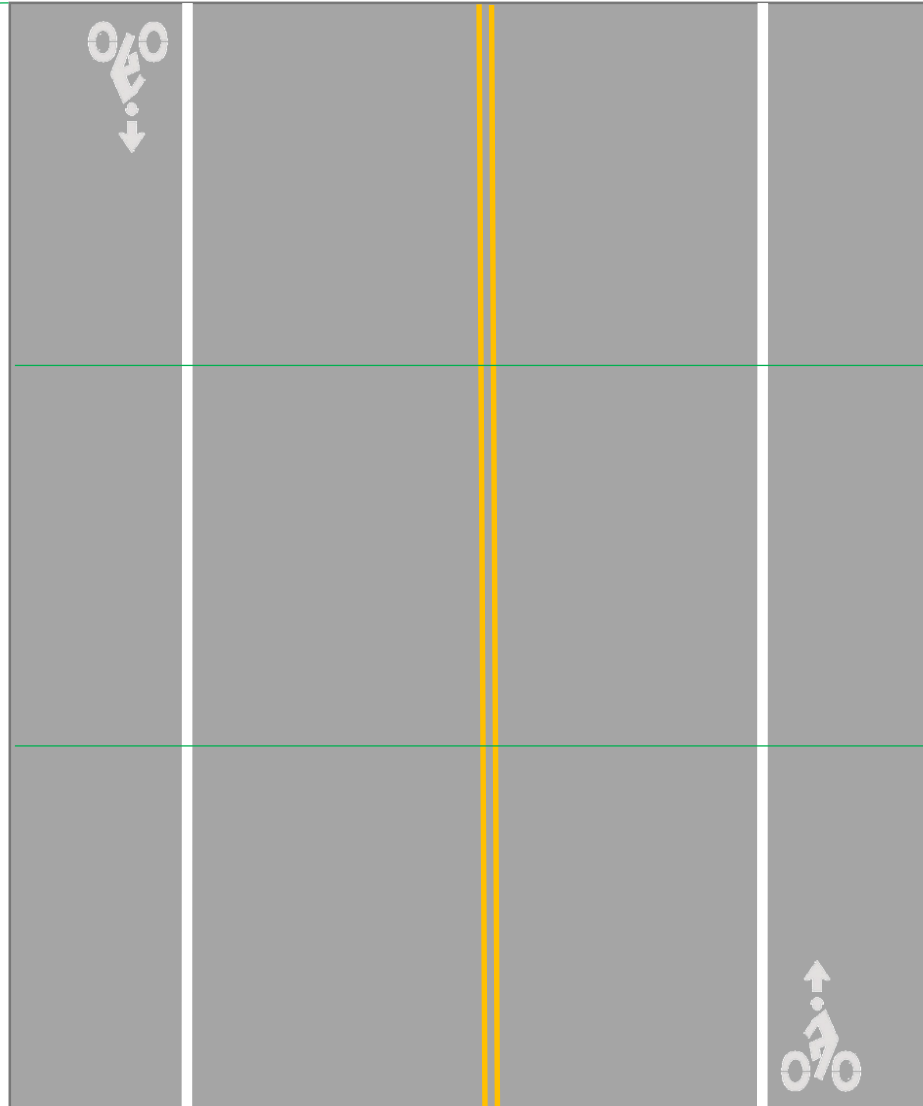
<http://www.peopleforbikes.org/blog/entry/biking-walking-soar-collisions-plummet-along-oaklands-protected-bike-lanes>

Quantifying Bike/ Pedestrian Gap Closure in the SHOPP Tool

Beginning of Bike Facility

Quantify Length in Miles

End of Bike Facility



Gap Closure
Project Extent

Quantifying Bike/ Pedestrian Gap Closure in the SHOPP Tool

Beginning of Bike Facility

Ex. 1.5 Linear miles
Gap Closure: 1.5 miles

End of Bike Facility



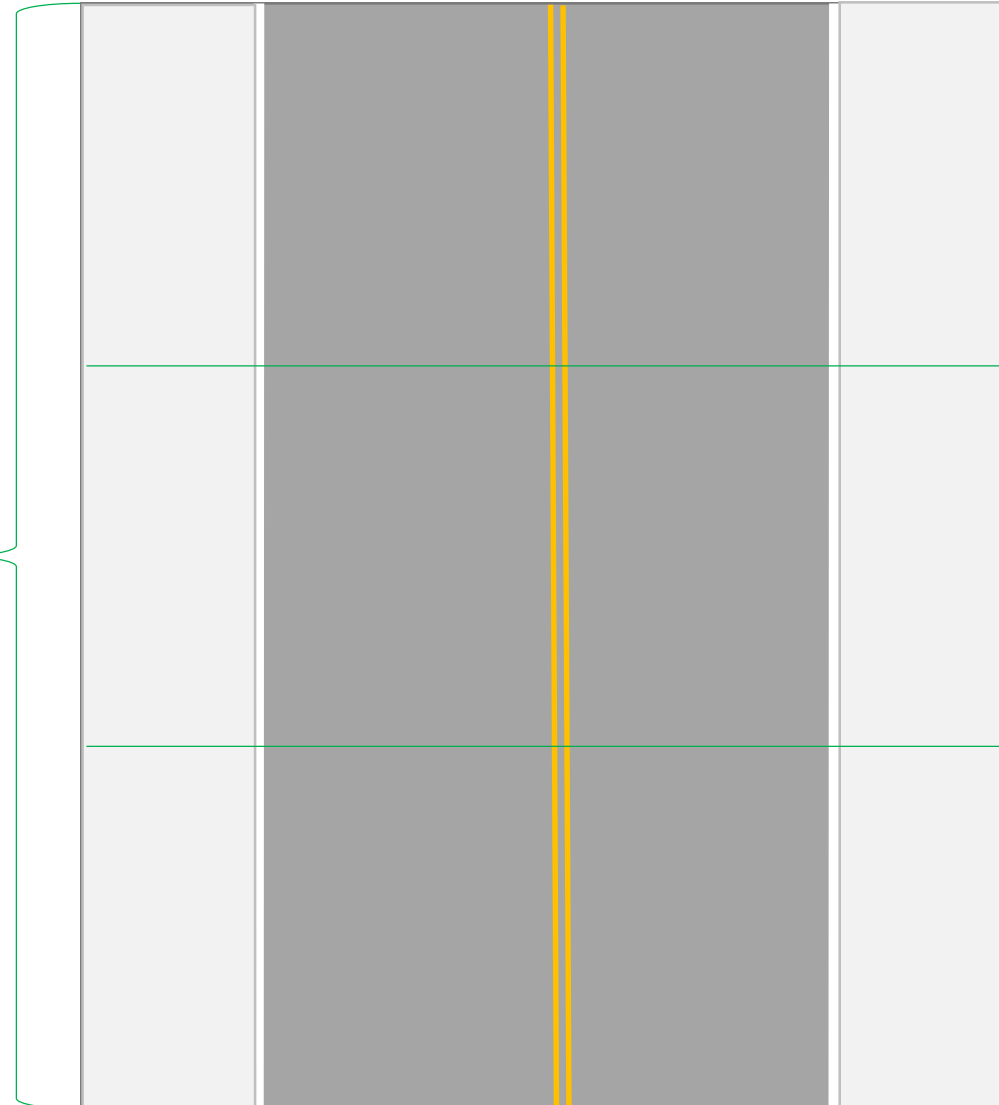
Ex: 0.5 miles
Class II Bike Lanes: 1.0
Lane Miles (New Asset)

Quantifying Bike/ Pedestrian Gap Closure in the SHOPP Tool

Beginning of Pedestrian Facility

Quantify Length in Miles

End of Pedestrian Facility



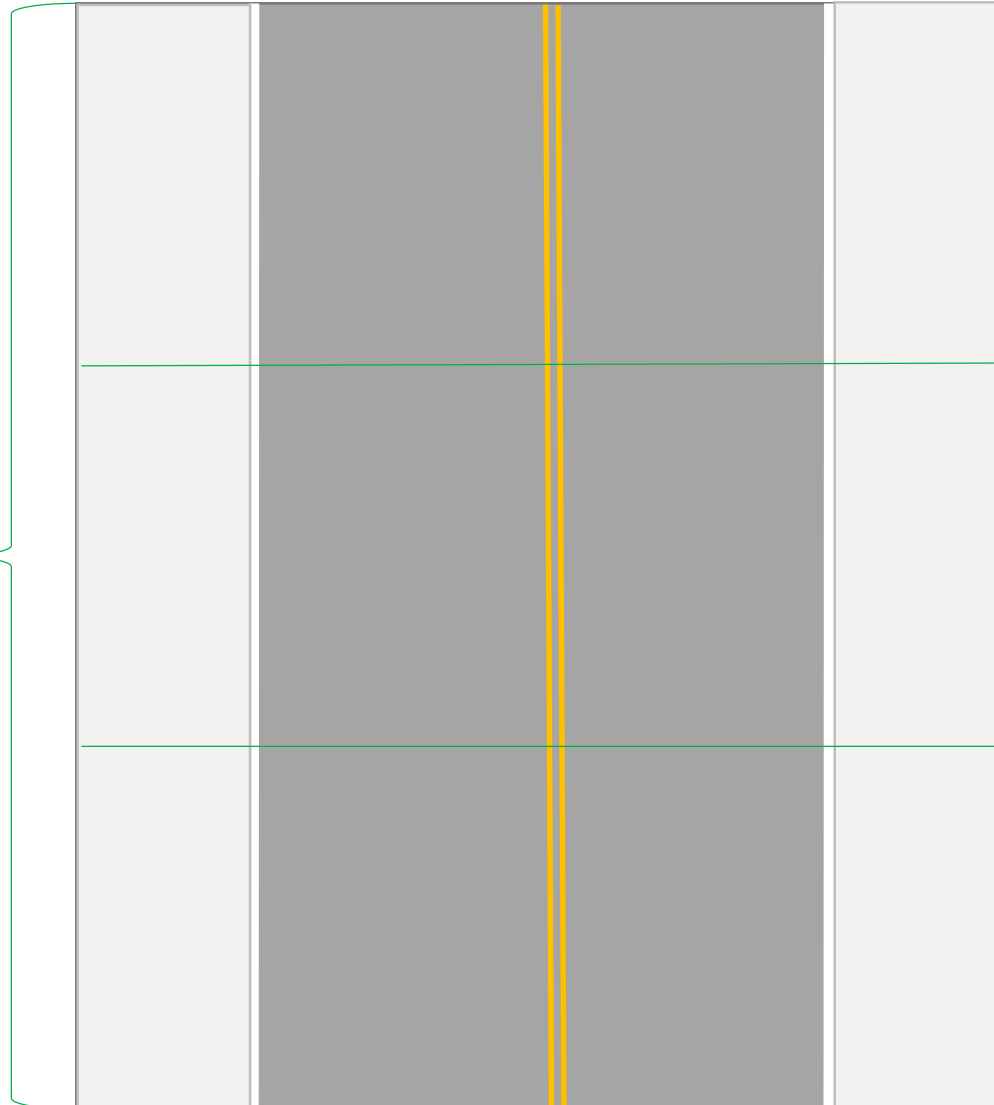
Gap Closure
Project Extent

Quantifying Bike/Pedestrian Gap Closure in the SHOPP Tool

Beginning of Pedestrian Facility

Ex. 800 linear feet
Gap Closure: .15 miles

End of Pedestrian Facility



Ex: 300 linear feet
New Sidewalk: linear feet

Quantifying Bike Lane Gap Closure in the SHOPP Tool

Telegraph Avenue Example

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H08	Streets	Class IV Separated Bikeway (201.999)	Lane Miles	1.2				1.2	Parking-protected; bi-directional
H09	Streets	Bike Lane Gap Closure	Linear Miles	0.85				0.85	1 connect; 3 intersect
H10	Streets	Conflict zone green paint (201.999)	EA	45				45	
H12	Streets	Enhanced Crosswalk Visibility (201.999)	EA	8				8	Continental
H16	Streets	Lane Reduction (Road Diet) (201.999)	Linear Miles	0.6				0.6	

H18: Overpass/Underpass – Pedestrian and Bike

Definition:

- A facility for pedestrians and/or bicycles that provides a connection either over or under a state highway facility that is separate from motor vehicle traffic.
- Pedestrian overcrossings (POC) or undercrossings (PUC) connect pedestrian walkways; bicycle overcrossings (BOC) or undercrossings (BUC) connect bikeways or bike routes and can be built to Class I or Class IV standards.

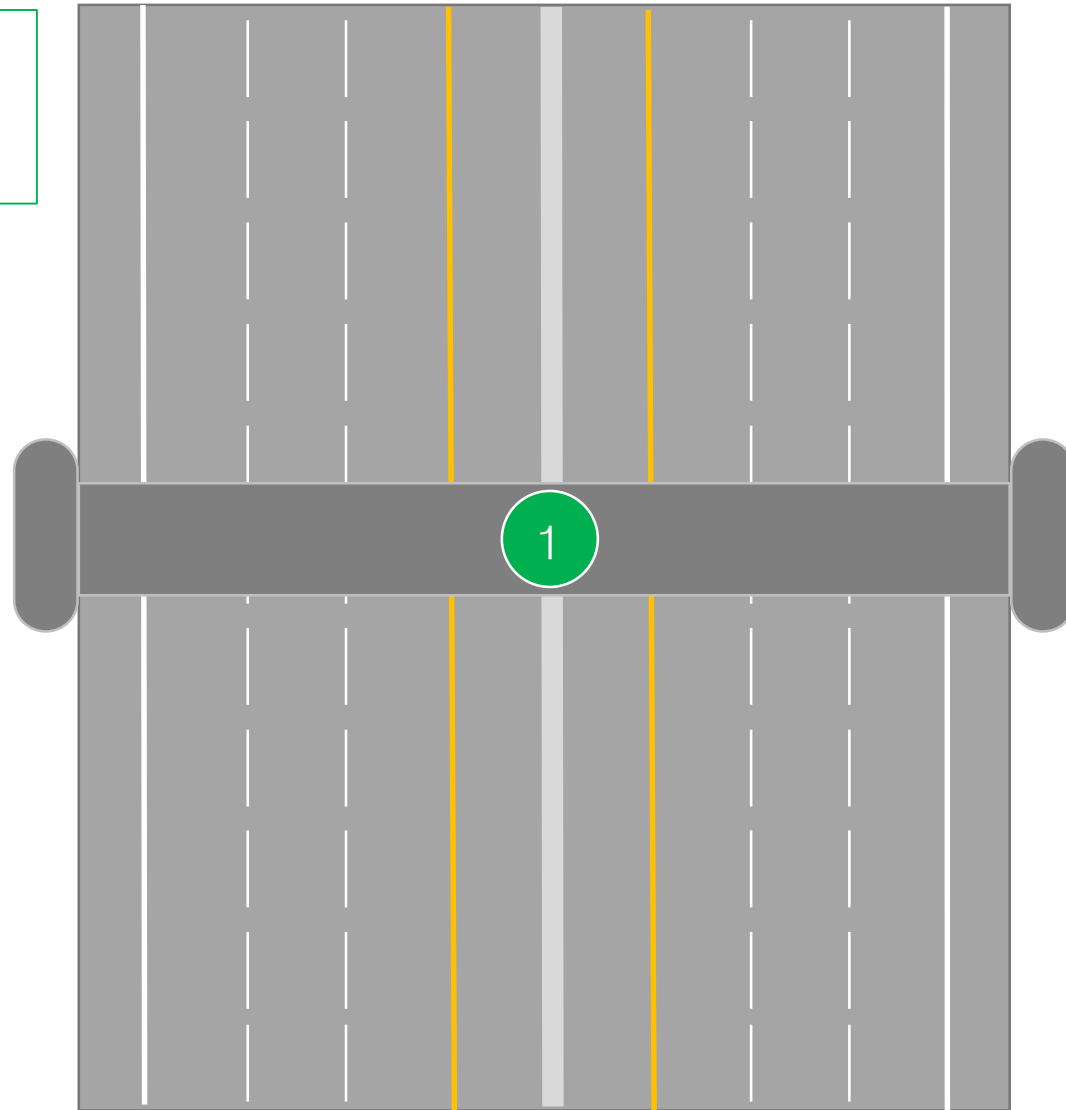
Guidance:

- Must be ADA accessible.
- 8 ft. wide minimum walkway; 14 ft. if the overpass accommodates bicycles
- See [HDM 208.6](#), [HDM Topic 309.2](#), [HDM Topic 1003.1](#), [DIB 82](#), and [DIB 89](#) for more information.




Quantifying Overpass/Underpass – Pedestrian and Bike in the SHOPP Tool

- Quantify number of overpasses/underpasses constructed.



Quantifying Overpass/Underpass – Pedestrian and Bike in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H18	Streets	Overpass/Underpass – Pedestrian & Bike (201.999)	EA	1				1	PBUC

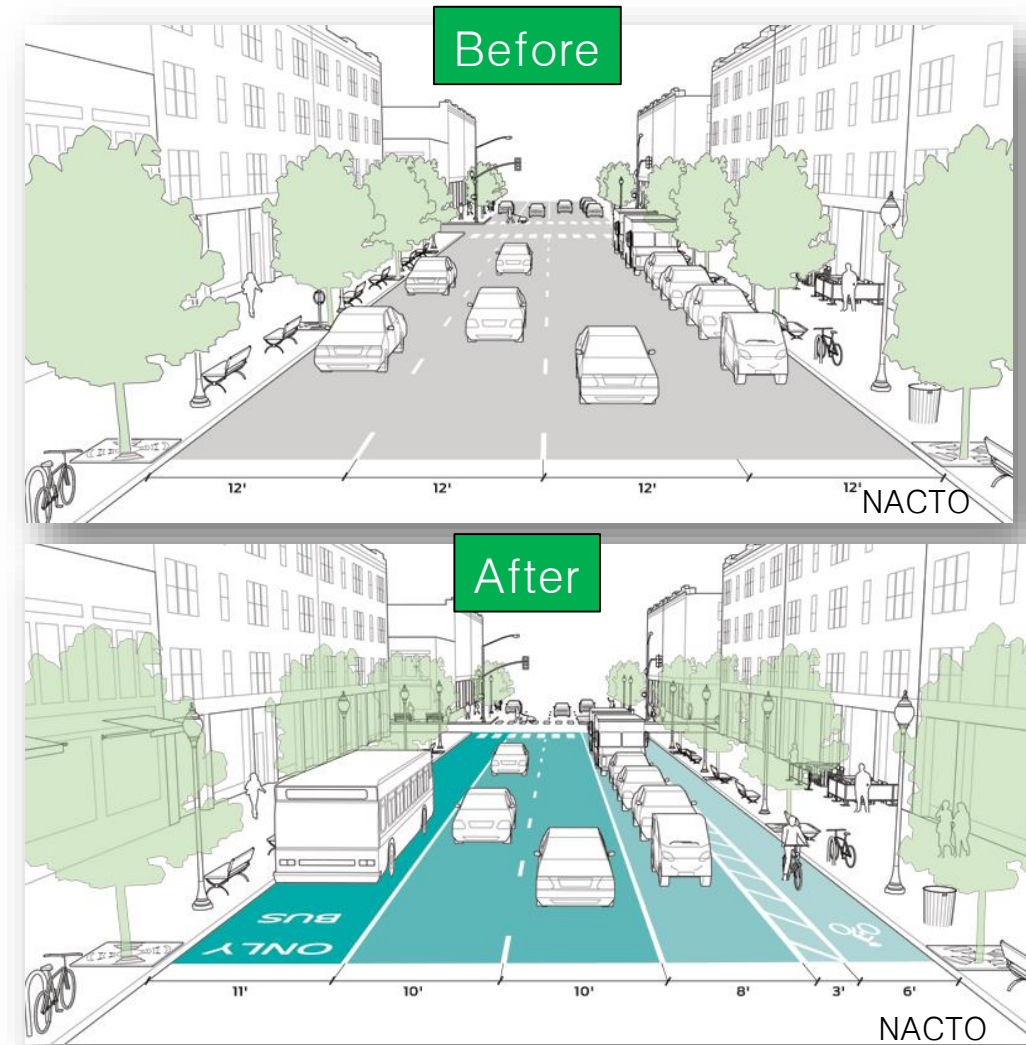


PBUC: Pedestrian/Bike Undercrossing
PBOC: Pedestrian/Bike Overcrossing
PUC: Pedestrian Undercrossing
POC: Pedestrian Overcrossing
BUC: Bicycle Undercrossing
BOC: Bicycle Overcrossing

H15: Lane Narrowing

Definition:

- Road space reallocation method that reduces automobile lane widths to accommodate multi-modal transportation.
- Most relevant when cost, scope and schedule would preclude widening, due to right-of-way constraints, for complete streets facilities.
- Guidance on Lane Width:
 - Highway Design Manual: 11 ft min. ([Chapter 300, Topic 301.1](#))
 - NACTO: [10 ft. lane widths](#) “are appropriate in urban areas and have a positive impact on a street’s safety without impacting traffic operations”.

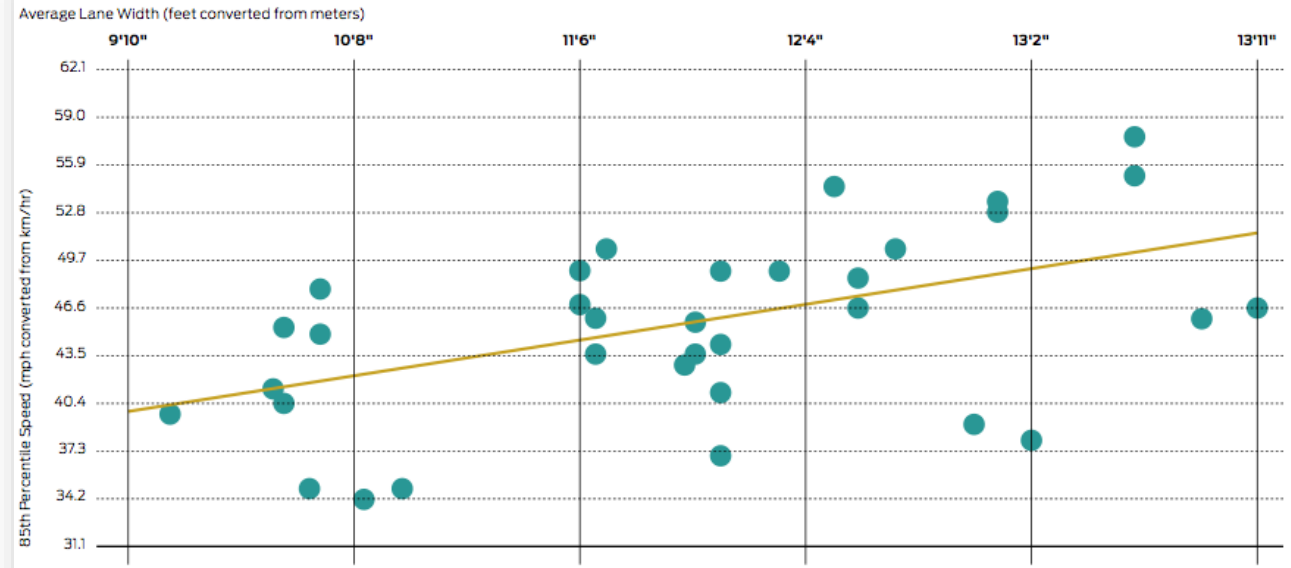


H15: Lane Narrowing

Why should we narrow a lane?

- Safety
- Sustainability
- Access
- Livability

Wider travel lanes are correlated with higher vehicle speeds.



"As the width of the lane increased, the speed on the roadway increased... When lane widths are 1 m (3.3 ft) greater, speeds are predicted to be 15 km/h (9.4 mph) faster."

Chart source: Fitzpatrick, Kay, Paul Carlson, Marcus Brewer, and Mark Wooldridge, 2000. "Design Factors That Affect Driver Speed on Suburban Streets." *Transportation Research Record* 1751: 18-25.

Regression Line

85th Percentile Speed of Traffic

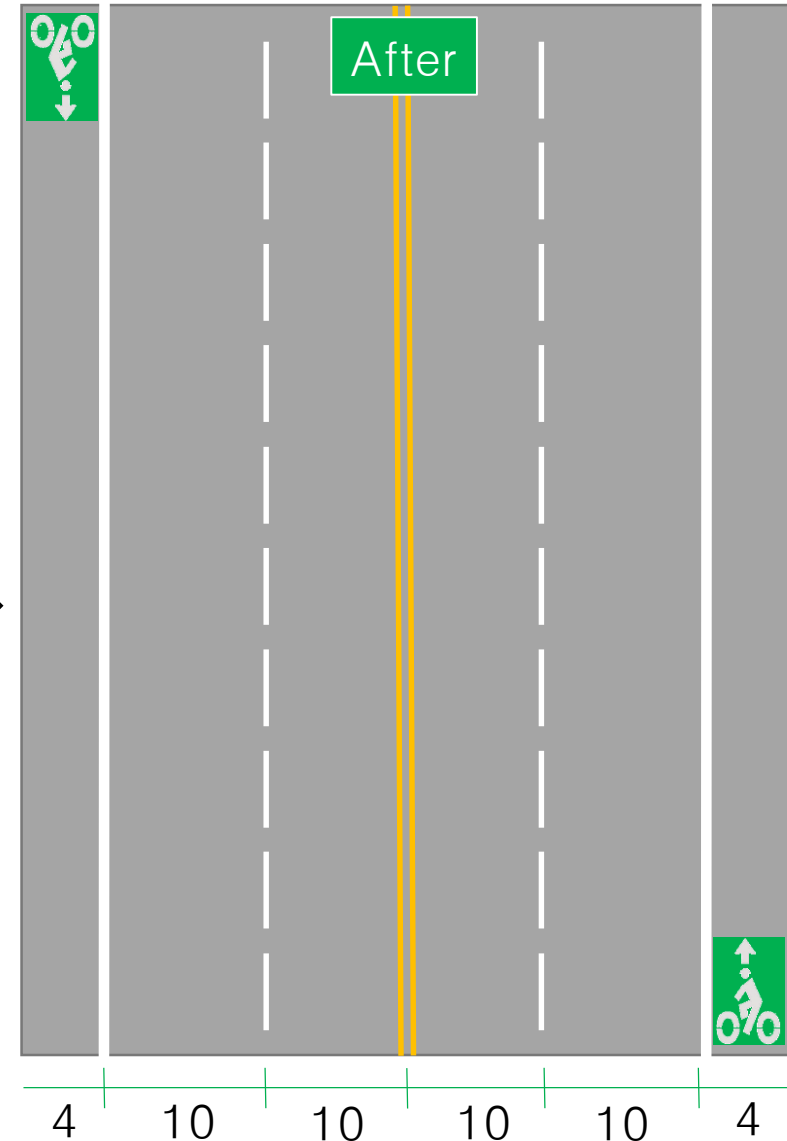
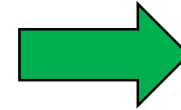
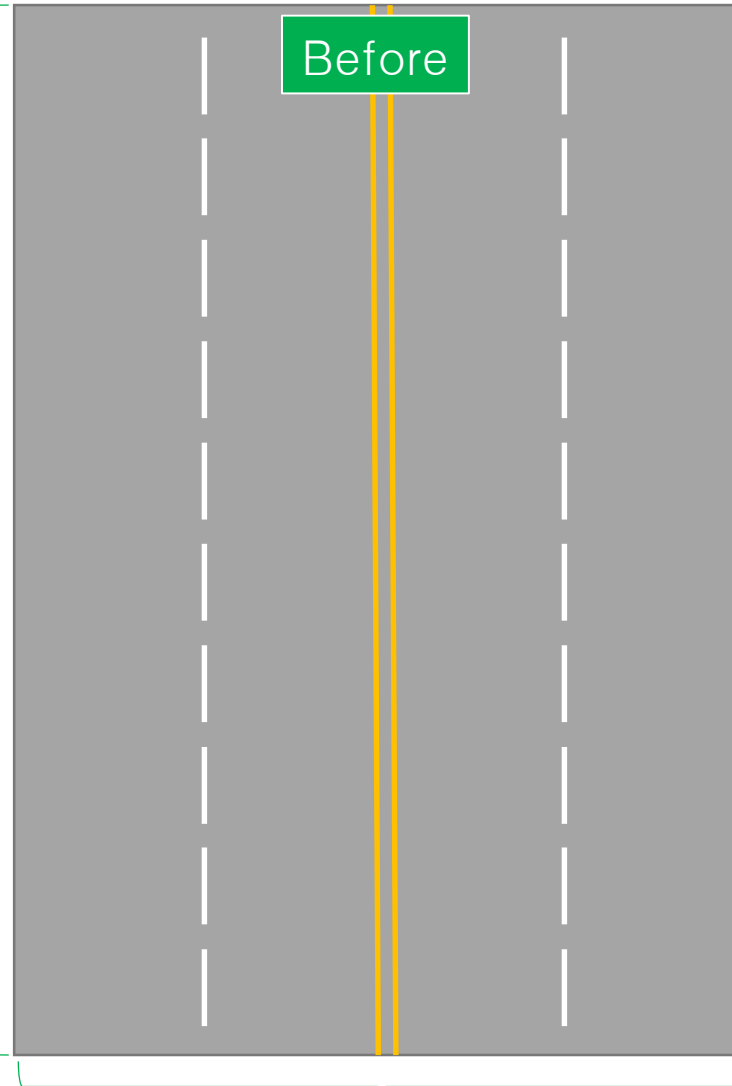
NACTO

Quantifying Lane Narrowing in the SHOPP Tool

Beginning of Project

Quantify
Length in
Miles
Length: 1 Mile

End of Project



Quantifying Lane Narrowing in the SHOPP Tool

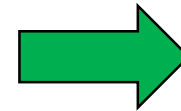
Beginning of Project

Before

Length: 1 Mile
Lane Narrowing: 1
Mile
Class II: 2 Miles
Conflict zone
green paint: 2

End of Project

48 feet= 4 12-ft lanes



After



4 10 10 10 10 4

Quantifying Lane Narrowing in the SHOPP Tool

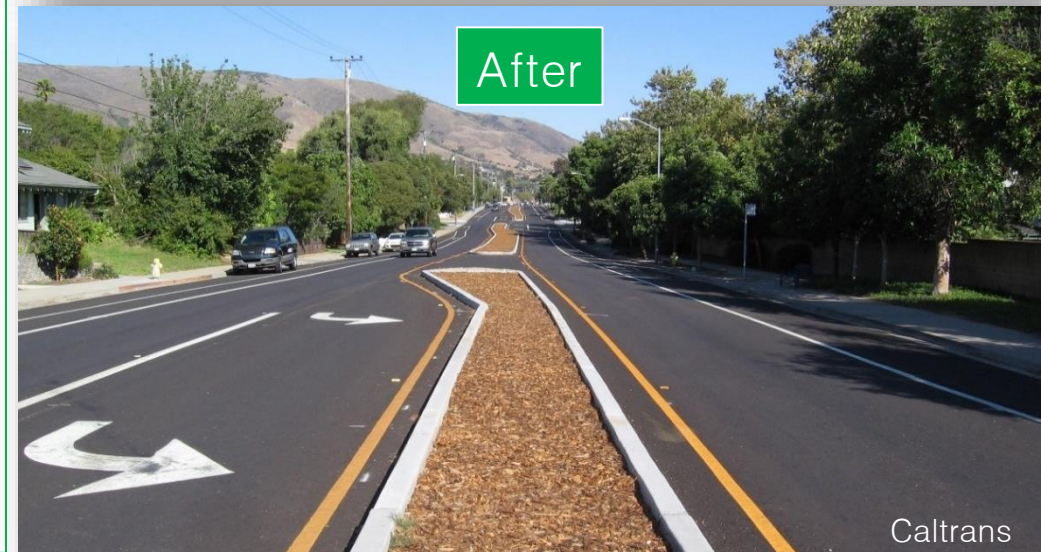
ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H06	Streets	Class II Bike Lane (201.999)	Lane Miles	2				2	Bi-directional
H10	Streets	Conflict zone green paint (201.999)	EA	2				2	2 pavement marking enhancements; 1 intersection; 1 driveway
H15	Streets	Lane Narrowing (201.999)	Linear Miles	1				1	



H16: Lane Reduction (Road Diet)

Definition:

- Roadway reconfiguration that increases road space for multi-modal transportation.
- Traditionally involve a 4-lane undivided roadway segment converted to a 2-lane roadway with two-way left turn lane, and bike lanes.
- Crash reduction factor for all road users of 19–47% depending on context (FHWA).



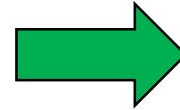
Quantifying Lane Reduction (Road Diet) in the SHOPP Tool

Beginning of Project

Before

Quantify
Length in
Miles
Length: 1 Mile

End of Project



After



Quantifying Lane Reduction (Road Diet) in the SHOPP Tool

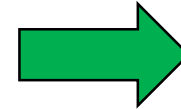
Beginning of Project

Before

After

Length: 1 Mile
Lane Reduction:
1 Mile
Class II: 2 Miles
Conflict zone
green paint: 2

End of Project



Quantifying Lane Reduction (Road Diet) in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H06	Streets	Class II Bike Lane (201.999)	Lane Miles	2				2	Bi-directional
H10	Streets	Conflict zone green paint (201.999)	EA	2				2	2 pavement marking enhancements; 1 intersection; 1 driveway
H16	Streets	Lane Reduction (Road Diet) (201.999)	Linear Miles	1				1	



H04: Bus Bay/ Turnout/ Pull Out

Definition:

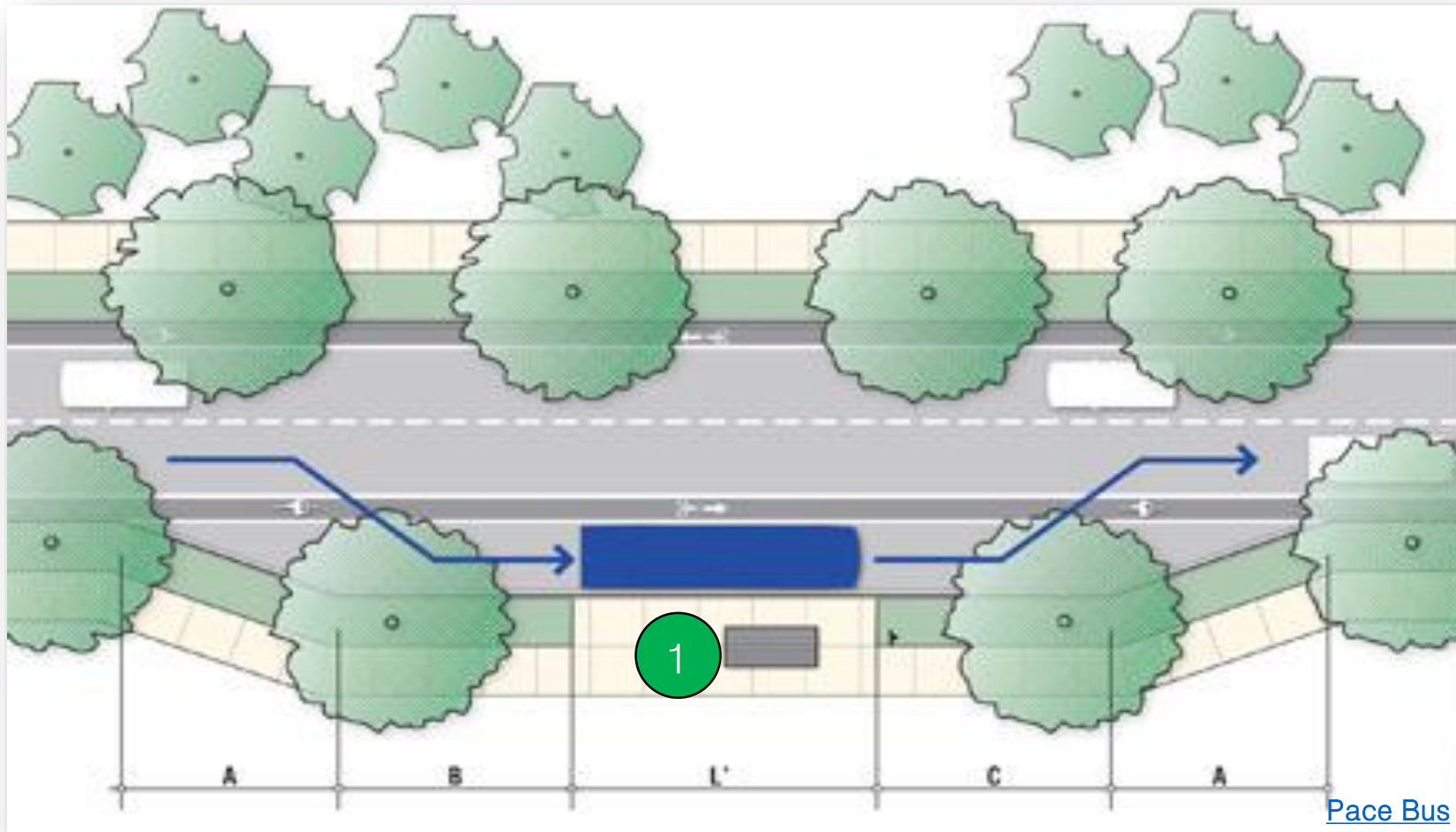
- An indentation in the curb which allows a bus to stop completely outside of the traveled way.

Guidance:

- May be created by simply restricting parking.
- Prioritizes through traffic which may increase bus dwell times and is best suited where stopping in-lane may cause issues.
- Provide sufficient sidewalk width
- Consider potential conflicts between buses and bikes.
- See [HDM 303.4](#)
- [NACTO](#)



Quantifying Bus Bay/Turnout/Pullout in the SHOPP Tool



Quantifying Bus Bays/Turnouts/Pullouts in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H04	Streets	Bus Bay/Turnout/Pullout (201.999)	EA	1				1	



H19: Park and Ride Lots

Definition:

- A parking lot facility that allows users to increase their travel options while reducing GHG, VMT, and congestion on the SHS.

Guidance:

- Consider on all projects that include new freeways, interchange modifications, lane additions, transit facilities, and HOV lanes.
- Design as a multi-modal facility – accommodate all modes of travel and ADA.
- Bus Pads should be used if buses access the park and ride lot.
- Refer to [HDM](#) 604.7, 626.2 (2,3), Table 636.4, 905.1, 905.2
- [PDPM Ch 8 pg. 52](#)



Quantifying Park and Ride Lots in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H17	Streets	Park and Ride Lot (201.999)	EA	1				1	Bus pad, crosswalk, lighting, bike parking



H27: Transit Stop Improvements

Definition:

- Project elements that improve transit operations or the transit user experience.
- Many assets could qualify, including:
 - Bus Pad
 - Bench
 - Transit Shelter
 - Bicycle and Pedestrian access
 - Pedestrian-scale lighting
 - Bus bulb
 - Bus-only queuing space
- Involve local transit provider for decision-making and funding.
- Guidance: Highway Design Manual Chapter 100, Topic 108.2–5.
 - Index 303.4 (3)



H28: New Transit Stop

Definition:

- A new, clearly marked stop for a surface transit route that calls attention to the stop and explains the transit routes servicing the stop.

Guidance:

- Coordinate with local transit provider on transit route modifications.
- Consult with local development coordinators to assess
- For more information on bus stop planning, refer to NACTO.org.



Quantifying Transit Stops in the SHOPP Tool

- Quantify improvements per transit stop improved.
- Comments section can specify assets constructed with the project.



Quantifying Transit Stop Improvements in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H27/ H28	Streets	Transit Stop Improvements (201.999)/ New Transit Stop	EA	1			1		Shelter, bulb, bus-only, access, light



Improvements for 1 Bus Stop or 1 New Bus Stop

H22: Vegetative Street Swales

Definition:

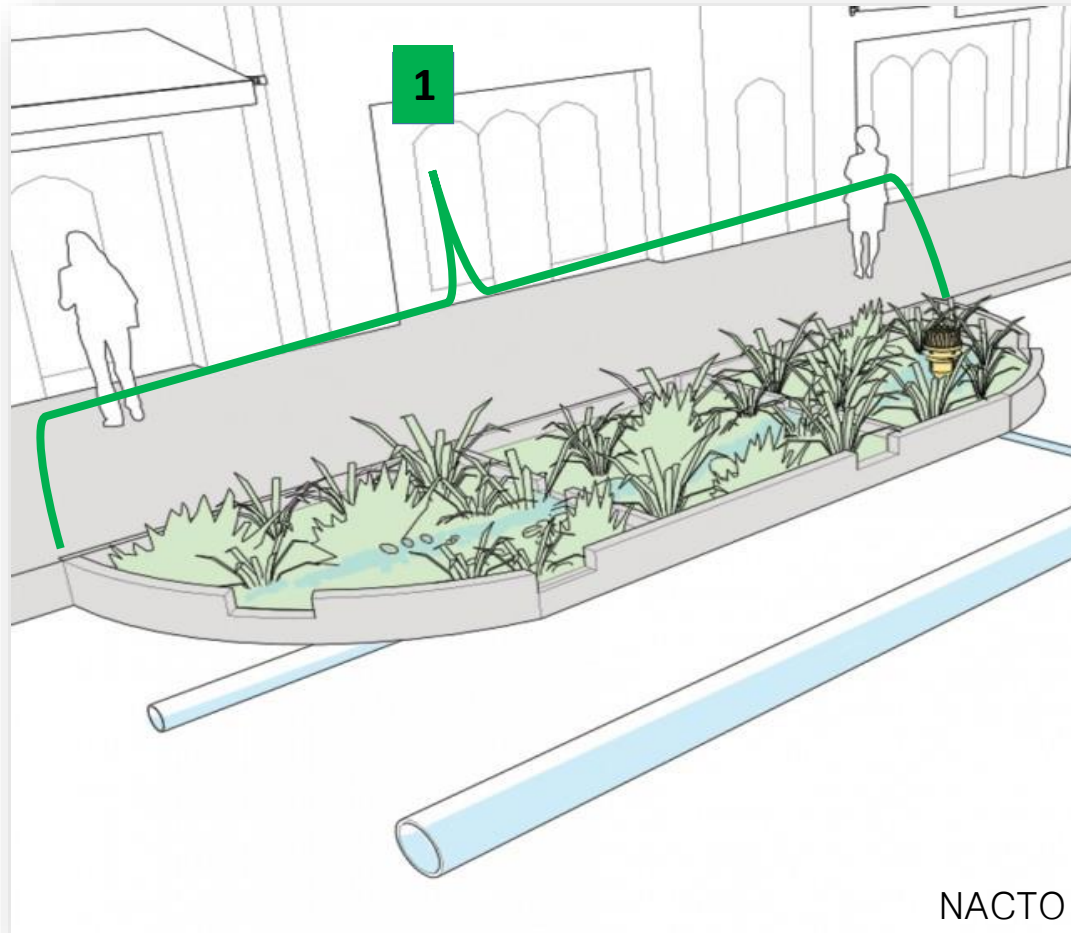
- Vegetated, shallow, landscaped depressions designed to capture, treat, and infiltrate storm water runoff as it moves downstream.

Guidance:

- Can be integrated with medians, bulb outs, and other public space
- Acts as a traffic calming measure.
- Refer to HDM 861.11 – Water Quality Channels and [Biofiltration Swale Design Guidance](#) for more information. [NACTO](#) is also an informative resource on swales.



Quantifying Vegetative Street Swales in the SHOPP Tool



Street Swales are counted individually and details can be added in the comments box of the SHOPP tool.

Quantifying Vegetative Street Swales in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H21	Streets	Vegetative Street Swale (201.999)	EA	1				1	



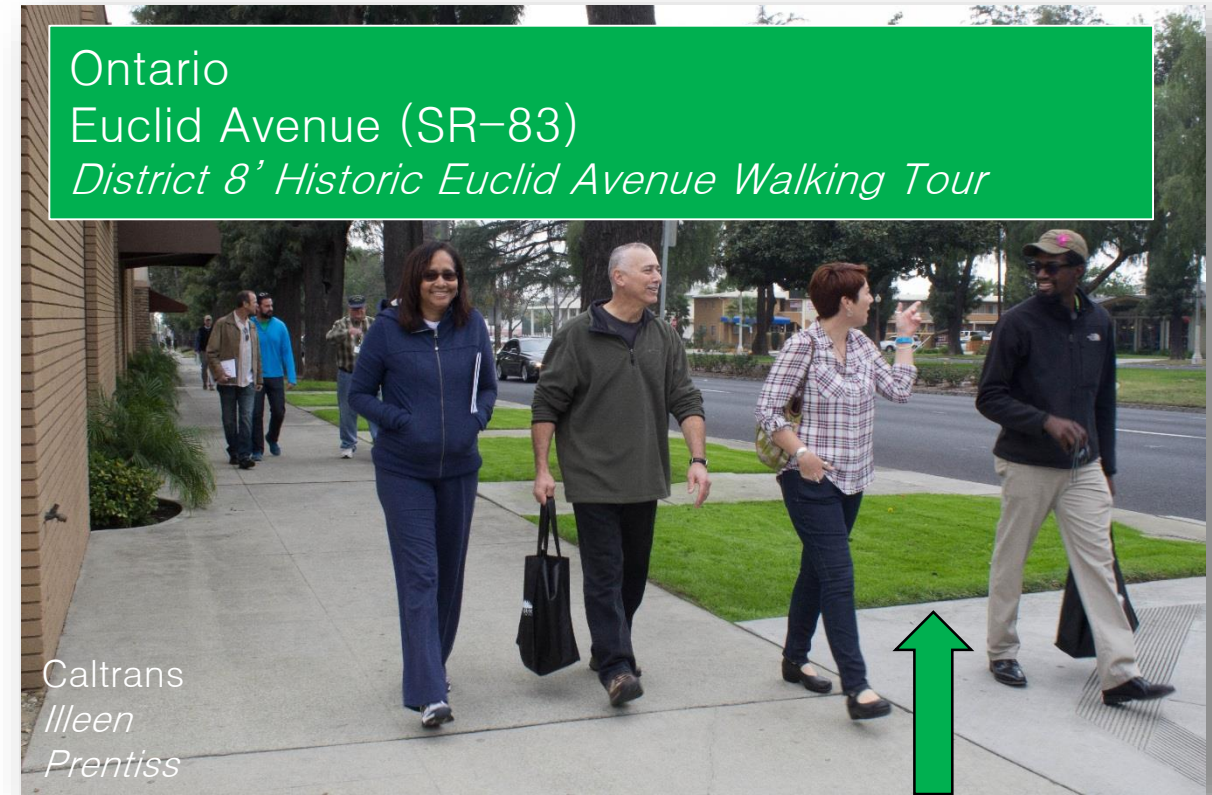
H23: Vegetative Buffer Between Cars/Bikes/Peds

Definition:

- The use of landscaping along a highway at the sidewalk level to provide separation between motorists, cyclists, and pedestrians.
- Can reduce the visual width of the highway, providing a traffic calming effect.
- Provide drainage, water quality and aesthetic benefits.
- Certain Street Trees can be planted in the buffer to shade pedestrians and provide environmental benefits.

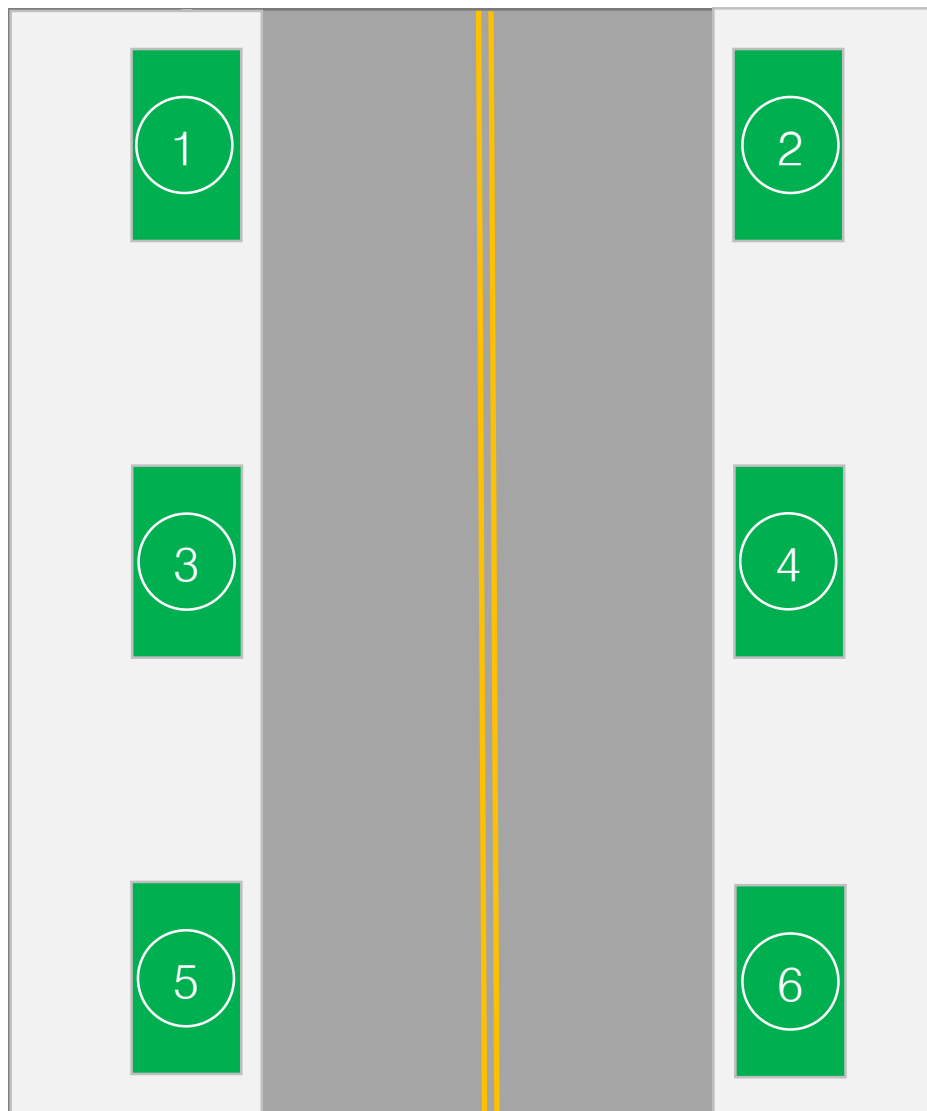
Guidance:

- Refer to Caltrans' [Landscape Architecture manuals](#) website.



Quantifying Vegetative Buffer in the SHOPP Tool

- Quantify number of shade structures provided.



Quantifying Vegetative Buffer in the SHOPP Tool

ID	Activity Category	Activity Detail	Unit of Measurement	Quantity	Assets in Good Condition	Assets in Fair Condition	Assets in Poor Condition	New Asset Added	Comments
H23	Streets	Vegetative Buffer Between Cars/ Bikes/Peds (201.999)	EA	6				6	